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WE print this week another letter about the meter, from a well-known engineer. Mr. NEWTON does not seem to have considered Dr. BARNARD'S suggestion as to the metric foot. Indeed, we do not recall any attempt to introduce that unit in practice. Perhaps Dr. BARNARD can furnish some facts as to its use. Meanwhile, we do not think it necessary, in giving to both sides, as we do with pleasure, the opportunity to be heard, that we should superfluously reiterate our own opinion, which is, as our readers know, in favor of the adoption of the metric system, whenever and wherever that can be done. *

A SPECIAL dispatch to the *Tribune* says:

"PARK CITY, UTAH, April 26.—The West Ontario Mining Company has no ledge and no title to any property here. It is not known here at all. The company is a wild cat. Further particulars by mail."

The same paper, in speaking of the above, says:

"Some information of special interest to stockholders of the West Ontario Mining Company, of which J. E. Coleman is president, and M. C. Jeffers is secretary, with office at No. 38 Broadway, will be found in a special dispatch to the *Tribune* from Park City, Utah, where the mines are claimed to be located."

It does not of necessity follow that a mine, or, more properly, a mining claim, does not exist in a district because it is "not known" there; but it is excellent evidence that it has but poor prospects, and is something to be avoided by the public.

SOMETHING REALLY EXTRAORDINARY.

We have been favored with a copy of the Charlotte, N. C., *Observer*, dated April 14th, 1881, and containing a long article descriptive of the works and plans of the Adams Mining and Reduction Company, now about to commence operations just outside of that city. The ingenious and enthusiastic journalist who, after visiting the works and interviewing the officers of the company, has prepared this account, remarks in an introductory way that the "ideal perfection" of the establishment "reminds one of MOORE'S Utopian fancies, where every thing is as it should be." This evidently means a good deal; in fact, it must mean MORE; and at all events, it is quite justified by the description which follows.

Modestly premising that "it is well known to geologists, metallurgists, and scientists generally, that North Carolina is the richest in mineral wealth of any State or territory in the Union" [We leave Mr. RICHARD GRANT WHITE to characterize this specimen of the "grammarless tongue"]; that its placer mines have already produced "ten millions of gold," and its vein mines "five millions of dollars;" and that only the lack of business principles and proper processes has prevented these returns from being larger, the journalist proceeds to demonstrate the inadequacy of amalgamation and of chlorination, and the efficacy of smelting as "the only practical, economical, and exhaustive method of treating the auriferous sulphurets of North Carolina, or anywhere else." We remark in passing that his final objection to chlorination is that, "however well it may work on a limited class of ores, or on perfectly prepared sulphides, it involves so much danger to life and health, so many skillful manipulations, and such an unwearied application of intricate chemistry that any substantial hopes of success in this direction are, to say the least, highly questionable. As proof of this, WEBSTER defines chlorine as a heavy gas of greenish color, having a disagreeable, suffocating odor, destructive of life." WEBSTER is, of course, conclusive metallurgical authority; and the superior sanitary character of lead and arsenic fumes, sulphurous acid, sulphureted hydrogen, carbonic oxide, and other gaseous attendants upon roasting and smelting operations, is at once apparent.

Evidently, however, the success of the Adams Company and its smelting process is to rest upon its manager, of whom the following account is given:

"The engineer, chemist, and metallurgist of this corporation, and who is also president of the company, is Prof. HENRY W. ADAMS, A.M., M.D., LL.D., of New York City, a gentleman of the ripest scholarship and highest literary attainments. He is a native of Vermont, but a descendant of the old Adams stock of Massachusetts. He was fitted for college at Newberry Seminary, Vermont. He graduated at Wesleyan University, in Middletown, Connecticut. He studied medicine in Philadelphia, and received his diploma from the University of Pennsylvania. He studied law in New York, and has received all the degrees of several of the best colleges in the North. He has been the superintendent of public schools in two States, and has written many scientific books. In the last twenty-five years, he has taken out over one hundred letters-patent for his inventions in this country, and many in Europe. His compound steam-engine is now in use on all the sea-going vessels of the world, doubling the steam power and saving one half the fuel. Professor ADAMS'S great forte is chemistry, metallurgy, and engineering; during the last ten years, he has built forty-four complete sets of the finest and most successful works in the United States; a few years ago, he spent two years in traveling through every mineral State and territory of this country, and through the five Northern States of Mexico, with a view to gain a knowledge of the mines and the various processes in use for obtaining the precious metals; during this period, he built many small smelting furnaces, and tested many refractory ores, and discovered valuable fluxes for reducing them; he has built large iron blast-furnaces, and run them successfully in Pennsylvania. It can not be doubted, therefore, that Professor ADAMS is one of the best qualified men in the United States to be at the head of the Adams Mining and Reduction Company. We are highly gratified to welcome a gentleman so accomplished and capable of promoting the mineral prosperity of this State. The plant of the company comprises a mammoth stack of very symmetrical proportions, a building 60 feet square and two stories high; the ground floor for machinery, and the floor above for sleeping apartments for the workmen; several small buildings, and an assay office 24 feet by 36 feet, two stories high. In this building the Professor has arranged the largest assortment of chemicals, crucibles, scales, assaying tools, and furnaces ever collected in any similar establishment in the country; he has built one furnace of his own invention, ten times larger than the common muffle furnace, for smelting larger charges; he claims to have smelted many charges in this furnace composed of the most refractory sulphuret ores in this State, with perfect ease, and produced the largest buttons of ore from the same quantity of ore ever before known; and asserts that he has demonstrated conclusively the entire success of his method of treating the sulphuret ores of this State."

It is a humiliating confession to make; but confess we must, that we do not know ADAMS from ADAM. We can not, therefore, cavil at his accomplishments and achievements, except on the ground of a mean professional envy. Actuated by some such feeling, no doubt, we are obliged to declare that Professor ADAMS is far more learned than, in fairness to the rest of mankind, he ought to be.

But we do not find by studying further the account of his process and plant that he has brought his immense experience to bear with any particularly novel results. His plan is described as being, to break the ore with a Blake crusher, roast it in a retort-furnace, pulverize it with Cornish rolls and centrifugal pulverizers, concentrate it from four parts to one, compress it into balls with the necessary fluxes, melt it in a blast-furnace, and then refine the resulting base-bullion. This all sounds rather commonplace for a man of the Professor's titles and acquirements. True, he roasts in a furnace of his own invention, and smelts in a peculiar furnace, with peculiar fluxes; but apart from these specialties, the general operations described are all perfectly well known; and it is at present the universal hallucination of metallurgists that they can not be successfully employed in the manner above described, upon auriferous pyrites. Assuming that the Professor's roasting and smelting are perfect, he will need lead ores for the latter process. We are not aware that North Carolina can afford him large quantities of galena, or that the galena which it may furnish is highly argentiferous. Or again, if the Professor's roasting is as complete as he claims, it must leave the ore in just the right condition for the final operation of chlorination—the cheapest part of chlorination, indeed, since the crushing and roasting are what constitute the main expense of that method. Why not chlorinate, then, after having got so far?

We notice that the Professor's patent smelter resembles in many respects the ordinary iron blast-furnace. But it contains, two feet above the tuy-

eres, "three holes, a few inches in diameter, through which a powerful hot blast of flame and air is sent into the charge. This raises the temperature of the charge almost to the fusing-point, so that, when it settles down two feet lower to the tuyeres, it is melted very easily and rapidly," etc.

If the description of this "mammoth stack" is correct, and the Professor can manufacture any thing with it out of auriferous pyrites, except salamanders and scaffolds, he will certainly have a right to claim that he has accomplished something really extraordinary. While we meekly wait to be astonished, we may be permitted to indulge our envious skepticism, and adhere, in our crude and primitive way, to certain so-called principles which metallurgists of humble mold have blindly, as it were, followed for a few generations past.

We quote once more from the article referred to:

"A splendid tram-railroad has already been built, about 500 feet long, which connects the Carolina Central Railroad with the works, for the purpose of transporting the company's heavy machinery, coal, and ores. All the machinery, firebricks, and tiles have been finished in splendid style, and have been paid for in Boston, New York, New Jersey, and Pittsburg. A part of these are already on the site, and the balance is already shipped. The works will be completed in about three months and ready to run. The company owns the Professor's patents in the State of North Carolina; he owns one third of the capital stock of the corporation, and all his patents outside of North Carolina, for all the United States and territories. It is the object of the company to build model works here, and to run them on business principles; to buy ores from all parties who have them to sell, according to their assay value, and at prices that will pay a fair profit to both parties; to sell rights to duplicate these works in any other place or places within this State, the profits of which will come into this parent corporation. The capital stock of the company is $600,000, which has all been paid in in money, machinery, and other property, and the stock is unassessable. The par value of each share is five dollars. One fourth part of the whole capital stock is reserved in the treasury to be sold for working capital. As the enterprise is so immediately allied to the mineral industry of North Carolina, a portion of this stock is offered at one dollar per share to the citizens of this State. At this low figure, there is scarcely a poor man who can not invest a few dollars in this enterprise. The company is not necessarily limited to the smelting of gold and silver ores. The works are so constructed that the ores of copper and other metals can be smelted equally as well. The great copper mines may be sources of profit. The immense iron mines stretching over thirty counties, many of which are the largest, purest, and richest in the world, free from both sulphur and phosphorus, are prospective sources of revenue. Brains, enterprise, and money must win in transmuting this immense mineral wealth into gold. Ores, fluxes, and fuel will be wanted in great abundance. This will give employment to railroads, laborers, and teams. The company will want 500 bushels of charcoal per day in three or four months. Who can reasonably doubt that the company, located in the midst of such mineral wealth as we claim to have, with railroad facilities, and where good labor can be had for 75 cents per day, and charcoal for 6 cents per bushel, with a climate so mild and salubrious all the year round, can fail to succeed, when conducted with science, experience, skill, and thorough business methods?"

To the concluding question, Who can reasonably doubt that this company can fail to succeed? we are tempted to reply promptly, Nobody! But this matter deserves, in conclusion, a few serious words. Prof. HENRY W. ADAMS may be engaged in an experiment more reasonable than the newspaper reporter has made it appear. He may not be responsible for the absurd puffing of his character and performances which places him in the light of a charlatan. We should be sorry to wrong a worthy man by accepting the statements of another, even though an "interviewer," as his own account of himself. But if Professor ADAMS, as president of a stock company, invites poor men in North Carolina to buy his stock, on the strength of such accounts of his enterprise as we have now before us, it is but fair to warn those poor men that the statement thus put forward, apparently on his authority, contains nothing to prove that Professor ADAMS is a competent metallurgist, or that his scheme has any prospects of success, but many things calculated to raise suspicions of the contrary. If Professor ADAMS can remove these suspicions, our columns are open to him. *

STANDARD TIME.

The American Metrological Society has taken up a matter of great practical importance, namely, the establishment of uniform standard time over large sections of the country, in lieu of the present inconvenient and unnecessary multiplicity of local time; and the reform it suggests is at once recommended by simplicity and ease of execution. President BARNARD has issued on this subject two circulars.

In the first circular, the obvious disadvantages of the present system or lack of system are pointed out. Every meridian has its own local time, scientifically speaking; but there is no use in maintaining, for the ordinary purposes of life, a standard of time which varies 4 minutes with every degree of longitude—the degree of longitude itself varying with the latitude. Moreover, it is not everywhere practicable for ordinary people to ascertain the true local time, so as to regulate their clocks thereby. Hence it has come to pass, by the irresistible force of human inertia, that large towns keep the true local time, and smaller towns adopt the time of the larger ones, or of the railroad companies. The latter adopt convenient meridians, each of which gives the railroad time for a considerable section of the road. Dr. BARNARD says there are over seventy such standard meridians now in use by railroad and other companies in the United States and Canada; and adding a moderate allowance for city local times not used by some railroads, we have at least a hundred separate local times, many of which differ but a few minutes from each other.

The inconvenience and annoyance which result to travelers are well known. Who has not lost a train or wasted time in unnecessary haste to catch one, by reason of the difference between railroad and local time? Who has not puzzled over railway connections as set down in the time-tables, and wondered whether the figures meant what they seemed to mean, or whether the two clocks at the same station were running on widely-sundered meridians? The observation of natural phenomena, also, such as tornadoes, auroras, earthquakes, meteors, and correct time-reports of such occurrences from local observers, would be greatly facilitated, as Dr. BARNARD suggests, by the use of uniform time-standards.

It is therefore proposed "that the community unite upon a division of this continent into a few sections, throughout each of which the times adopted by railroad, canal, steamboat, and telegraph companies, the city or town clocks and the clock-makers, shall all be kept as nearly as possible in agreement with one standard meridian. President BARNARD proposes, as the plan most likely to be adopted by other nations also, that a central meridian, 90° west of Greenwich, should be taken in the Mississippi Valley, and meridians east and west, at intervals of exactly one hour, or 15 degrees, should be located as the standards for their respective sections. The following schedule shows this plan:

PROPOSED SCHEDULE OF STANDARD TIMES.

Geographical Section.	Standard Meridian west of Greenwich.	Standard Time slower than Greenwich.	Standard Time slower or faster than true "local times."	Designation of proposed Standard Time.
		H. M. S.	Min.	
Newfoundland	60°	4 0 0	29 slower than St. John's, N. F.	Eastern Time.
New Brunswick			24 faster than St. John's, N. B.	
Nova Scotia			14 faster than Halifax, N. S.	
Canada			15 slower than Quebec.	
			18 faster than Toronto.	
			16 slower than Boston.	
Maine	75°	5 0 0	3 slower than New York.	Atlantic Time.
to			8 faster than Washington.	
Florida,			19 faster than Charleston.	
Ohio			45 faster than Montgomery.	
to			14 faster than Buffalo.	
Alabama,			30 faster than Detroit.	
Lower Lakes			38 faster than Cincinnati.	
Miss. Valley	90°	6 0 0	0 faster than New Orleans.	Valley Time.
Missouri Valley			1 faster than St. Louis.	
Upper Lakes			12 faster than St. Paul.	
Texas			18 faster than Kansas City.	
			19 faster than Galveston.	
			10 slower than Chicago.	
Rocky Mt. Region	105°	7 0 0	0 faster than Denver.	Mountain Time.
			28 faster than Salt Lake City.	
			12 slower than San Diego.	
Pacific States	120°	8 0 0	10 faster than San Francisco.	Pacific Time.
British Columbia			11 faster than Olympia.	
			12 faster than Victoria.	

The second circular issued by the Metrological Society contains a communication from Gen. W. B. HAZEN, the head of the United States Signal Service Bureau, from which it appears that that Bureau is ready to co-operate, on certain conditions, in the maintenance of public standard time-balls. General HAZEN's memorandum adopts the 75th, 90th, 105th, and 120th meridians, omitting the 60th as outside of the United States. He gives a list of 55 stations at which time-balls could at present be maintained.

The plan is certainly feasible, if it can once be fairly tried. In our judgment, the transportation companies are the proper agencies to begin it. If they would adopt it, there would be an immediate benefit, palpable to all. The traveler would traverse whole States without a change of time; and when the change was encountered, it would amount to just one hour. The general use of the new and simple standards would gradually but surely follow; and the happy device of peculiar names given to them would prevent all danger of confusion. Perhaps town councils, or even State legislatures, might step in to legalize the standards, each for its own jurisdiction. But we hardly think that would be necessary. State lines, in particular, might be unnecessarily oppressive. For instance, Montgomery, Ala., and perhaps, also, Cincinnati, might prefer "Valley time" to "Atlantic time." But these questions might be left to regulate themselves without imperiling the chief benefits of the reform. *

THE GENESIS OF OUR IRON ORES.*

By Prof. J. S. Newberry.

(*Concluded from page* 287.)

THE IRON ORES OF SOUTHERN UTAH.

During the past summer, which I spent chiefly in Utah, I visited the deposit of crystalline iron ore of Iron County, in the southern part of the territory. These ore-beds have been long known and were to some extent utilized by the Mormons in their first advent thirty years ago, but no satisfactory description of them has ever been published. As they constitute, perhaps, the most remarkable deposit of iron ore yet discovered on this continent, I have thought that some facts in regard to them might not be an unimportant addition to what is known of the economic resources of our country. The iron region referred to lies nearly three hundred miles directly south from Salt Lake City, and is situated in what

* From the *School of Mines Quarterly* for November, 1880.

is really the southern prolongation of the Wahsatch Mountains. The iron ores occur in the northern portion of a subordinate range, which attains its greatest hight in Pine Valley Mountain, near Silver Reef. Thirty miles north of this point, the ridge breaks down into a series of hills from one thousand to two thousand feet in hight, which consist chiefly of gray, fine-grained granite, with dikes and masses of trachyte and here and there outcrops of highly metamorphosed limestone. The ore-beds form a series of protruding crests and masses set over an area about fifteen miles long in a northeast and southwest direction, and having a width of from three to five miles. Within this belt, the iron outcrops are very numerous and striking ; perhaps one hundred distinct claims having already been located upon them, each one of which would make the fortune of a mining company if situated anywhere in the Mississippi Valley or the Eastern States. The most impressive outcrops are in the vicinity of Iron Springs, Oak Springs, and Iron City, of which localities the first and last mentioned are about twelve miles apart. Near Iron Springs, the *Big Blow-out*, as it is called, is a projecting mass of magnetic ore, which shows a length of perhaps a thousand feet by a width of five hundred, and rises in castellated crags one hundred feet or more above its base.

At Iron Springs, a still more striking exhibition is made by the Blair mine, which is a ragged crest of magnetite, black as jet, formed by the upturned edge of the thickest of a series of sheets of ore, which rises like a ledge of bedded rock two or three hundred feet above the adjacent lowlands. This outcrop is visible as a conspicuous black hill at a distance of several miles. The connections between the ore-bodies of this great iron belt are obscured by the *débris* from the easily decomposed trachyte and granite. It is evident, however, that for some miles the iron ore-deposits are continuous, or separated by very short intervals, as the outcrops occur within a stone's throw of each other, and the surface is everywhere strewn with blocks of rich magnetic ore, enough in themselves to supply all the furnaces of the country for years. It would seem that the iron forms a number of distinct and closely approximated belts, which are the outcrops of beds that stand nearly vertical, and go down into the earth like huge walls.

There is considerable diversity in the character of the ore, though it is about equally divided in quantity between hematite and magnetite. Some of the beds of both are exceedingly dense and compact, while others, though rich in iron, are soft and can be mined with the pick. Most of the ore is apparently very pure, containing a small amount of earthy matter and no foreign minerals. Some of the ledges, however, contain a large quantity of silica, the magnetite being mottled with white quartz; and one of the largest outcrops, though showing many millions of tons of ore apparently quite pure, is thickly set along certain zones, evidently strata of deposition, with crystals of apatite from a quarter to half an inch in diameter and two or three inches in length. At this location, many of the fragments are highly magnetic, and lodestone as strong as any known can be obtained there in great abundance. A few rods from this great outcrop is another of equal dimensions, in which the magnetite is apparently quite free from all impurities, showing neither quartz nor apatite. Near by is another exposure, perhaps a continuation of the last, of which the mass is half magnetite and the other half fine-grained and dense hematite. Across a narrow valley from this group, the hillside is covered with fallen fragments of a rich but soft and dark hematite, and at no great distance the soil is colored blood-red by the decomposition of a hematite so soft as to make no other show above the surface. Near this latter location, I noticed a line of outcrop of a very jaspery hematite, in some places only a ferruginous jasper closely resembling some of the more siliceous ores of the Marquette District.

As to the age of this remarkable series of iron ore-deposits, I can not speak with absolute certainty, though they are apparently Lower Silurian.

The granite of the hills which contain the iron is finer grained and less compact than that which forms the great granitic axis of the Wahsatch, and I suspect is the metamorphic condition of the quartzite beds which rest upon the Wahsatch granite. Some of the iron ore-beds in this granite are distinctly interstratified with it, and are certainly, like it, metamorphosed sediments. This is plainly shown at the Blair mine, where the principal crest of the hill is a distinct sheet of stratified, regularly-bedded magnetite, from thirty to forty feet in thickness, dipping toward the north at an angle of about eighty degrees. Parallel with this principal layer are other sheets of magnetite, separated by strata of granite and varying from a quarter of an inch to ten feet in thickness, as perfectly parallel and regular as any series of sedimentary beds ever seen.

On the whole, the Blair mine is the most interesting and instructive outcrop of iron known to me, and furnishes the most striking proof of the sedimentary origin of these wonderful ore-beds. None of the other outcrops are so distinctly stratified, but the Big Blow-out at Iron City affords an equally conclusive argument against the eruptive theory ; for while it appears to be a huge amorphous mass, like a hill of basalt, on examination it is found to be in large part composed of metamorphosed limonite ; that is, magnetite, which has the botryoidal and concretionary aspect and radiated structure of limonite, and was plainly deposited from water.

With the exception of the great iron deposits of Southern Utah, the far West is but imperfectly supplied with this metal. I have found magnetite and specular ores in small quantities in several places in the mountains of Oregon and California, and in the Rocky Mountain belt, and similar ores have been met with by prospectors and explorers in some of the districts which I have not visited. We have no evidence, however, that any other great deposits of iron exist in or beyond the Rocky Mountains. If it is true, which I do not believe, that there are anywhere iron ores that are truly eruptive in character, it is somewhat surprising that in the immense area where igneous rocks predominate in the far West, no masses of eruptive iron ore have been met with. We have reports of eruptive masses of magnetite at Nijni Tagilsk, in Russia, and of hematite on the island of Elba, but no observations have lately been made for the purpose of determining whether these are what they have been reported to be. The famous beds of magnetic and specular ore of Sweden have also been considered, up to a recent date, as eruptive ; but Prof. Otto Torell, Director of the Geological Survey of Sweden, with whom I was associated in the Centennial Exhibition, assured me that all the deposits of iron which he had visited in Sweden were metamorphic, and not eruptive, and that he had no faith in erupted ores of iron.

THE CLINTON ORES.

One of the most remarkable, certainly the most considerable, and perhaps the most important deposit of iron in the United States, is that which is known as the *Fossil ore*, a characteristic and almost constant element in the Clinton group of the Upper Silurian. This is an oolitic or granular calcareous hematite, which is traceable all along the belt of outcrop of the Clinton group, from Dodge County, Wisconsin, through Michigan, a portion of Canada, across New York, Pennsylvania, Maryland, West Virginia, East Tennessee, and to Rome, in Georgia, where it is covered by more recent deposits. In this long line of outcrop it is nearly continuous, and forms one stratum, or more, from three to twelve feet in thickness. The Clinton ore varies somewhat in character and richness at different localities, consisting of loose, flattened grains in Wisconsin, in East Tennessee of a highly ferruginous sandstone (there called the dye-stone ore, from its use as a domestic dye by the inhabitants), and shows its typical characters at Clinton, Oneida County, New York, and in the Broad-top region of Pennsylvania.

In the central portion of the interior basin, the Clinton ore is mostly buried, but in Southwestern Ohio shows itself distinctly in its proper place, but here is very thin. It is known to have its greatest development in a broad belt along the margin of the Silurian sea, of which the Archæan area, south of Lake Superior, the Canadian highlands, the Adirondacks, and the Blue Ridge formed the northern and eastern shores. The oolitic or granular structure of the Clinton ore is its most striking peculiarity, and upon microscopic examination it is found to consist of concretions of iron ore formed around some minute marine organism or fragment of shell or crinoid. The most marked peculiarity of its chemical composition is the large and constant percentage of phosphorus it contains, a feature doubtless due to its truly organic origin. If we look over the world for an iron ore now forming which will illustrate the origin of the Clinton ore, we find it in the granular or "mustard-seed" ore of the Swedish lakes. This is an oolitic ore, consisting of spherules of limonite which have formed around minute particles of some foreign substance. The water which flows into these lakes is highly charged with iron, since it is the drainage of a district rich in this metal. In the lakes, oxygen is absorbed and ferrous is converted into ferric oxide. This, collecting around some nucleus, ultimately sinks to the bottom, a ferruginous oolite, which from time to time is gathered as a crop. The Clinton ore was apparently formed much in the same way. The basin in which it accumulated was surrounded by a water-shed underlain by ferriferous rocks which furnished an unusual quantity of iron to the draining streams. This iron was precipitated in granules, which in successive ages formed beds many feet in thickness. Then a change of physical condition threw down upon it a sediment of another kind, and it was ultimately buried beneath all the Devonian and Carboniferous rocks. By their weight, its granules were compressed to flattened disks, and these were in some instances converted into solid rock ; and, like all the older limonites, this has finally lost its water and has been changed to hematite. Here we have a simple explanation of the formation of a widespread iron ore, which, since cheap and effective means have been devised for removing the phosphorus it contains, is destined to play an important part in the future industries of the country.

THE CARBONATES OF THE COAL MEASURES.

The Carboniferous iron ores consist (1) of the bedded calcareous carbonates which form part of the sheets of Coal Measure limestone; (2) the kidney ores, concretions of earthly siderite in the clay shales ; and (3) the black band, a ferriferous bituminous shale. Of these, the first variety was evidently formed, like the Clinton ore, in lakes which from time to time occupied more or less of the area of the coal basins. Usually the calcareous ore caps the limestone and seems to have been produced during an interval when the water basin was becoming shallow and contracted, so that the iron carbonate which was held in solution by a large body of carbonated water was precipitated as the quantity of water was diminished. The clay iron-stones are the products of times when the drainage into the coal basins was turbid with mud and yet carried much iron. When this mud settled, the iron diffused in it gradually segregated, to form concretions, the centers of spheres of attraction of somewhat uniform radius. At present, the calcareous and argillaceous carbonates are absorbing oxygen and are converted layer after layer into limonite or hematite, and I have noticed that the calcareous sheets and nodules are prone to change to hematite, while the clay iron-stones are always converted into limonite.

The black band ores were once carbonaceous muds composed of silt and completely macerated vegetable matter, deposited in water basins like the lagoons of some modern swamps. Here the abundant iron of the drainage water settled with the mud, but, curiously enough, the carbon of this mud in some way prevented the formation of concretions, and held the iron disseminated uniformly through the mass.

In all these Coal Measure ores, the abundance of decaying vegetable tissue kept the iron in the ferrous condition, and hence the shales and sandstones are, until aërated, gray or blue, never red, and the iron is the carbonate of the protoxide.

THE LIMONITES.

Along the east flank of the Alleghanies, and extending around into Alabama, Tennessee, and Kentucky, is an important belt of iron ores which are largely used, are well known to both the unlettered and learned, and yet have been something of a puzzle to all who have attempted to trace the history of their formation. All these ores, whatever may have been said to the contrary, are superficial in character. They occupy crevices, basins, and ore-chambers in the underlying rock, cover with their sheets the slopes of hills, or form nodules and concretionary masses in alluvial beds of gravel or sand. They are evidently the accumulations of iron carried in the surface drainage, deposited by aëration and oxidation, and filling whatever receptacles were open to receive them. As calcareous rocks are notoriously soluble in atmospheric water charged with carbonic acid, we find in them the greatest number of caves, crevices, and chambers, and both in this and other countries these are the common repositories of limonite. Much industry has been displayed in tracing the iron of these deposits to its source ; but so far to little purpose, inasmuch as it is plain that it has come from many

sources. The surface drainage of a country well supplied with iron in rock and soil has contributed its quota for ages; while the decomposition of pyritous rocks has supplied another portion, and finally the limestones which have been so extensively dissolved away in ages past have left their iron—frequently an important constituent—as limonite. Along the eastern flanks of the Alleghanies, the Silurian limestones have furnished some of the material and many of the receptacles for this brown hematite ore; while in Alabama, Tennessee, and Kentucky the Lower Carboniferous limestone, rich in iron, has lost its carbonate of lime, and left a residuum which, sometimes in place, keeping all its fossils, sometimes transported to a neighboring *nidus*, has formed deposits of iron which are destined to be the source of wealth for generations to come.

The formation of these limonite ores has evidently been going on from the Cretaceous age to the present time. The Cretaceous clays of Staten Island contain concretionary limonites that belong to this category; and similar clays which are said, though with doubtful propriety, to be Tertiary, at Hinsdale, N.Y., Brandon, Vt., and many other places, are accompanied by lignites and limonites. Some of these masses of limonite ore have been cast in molds that have since disappeared by erosion or solution. These molds have often been limestone chimneys or chambers, and the insoluble filling of these cavities now alone remains. Numerous examples of this kind could be cited in Pennsylvania and Virginia, and they have given rise to some wild speculation. The most recent suggestion I have seen is, that they are stalagmites in caverns of which the roof and sides have disappeared in a catastrophic caving of the undermined surface; but so far as my observation extends, limonite never forms supporting pillars in caverns, and the explanation I have given is more concordant with the facts I have observed.

The necessary brevity of this article compels me to pass without notice some large and interesting deposits of iron ore which are known to exist, and in some instances are extensively worked in this country. But an exhaustive review of our iron resources would form a volume, and this sketch has a different and far more restricted scope. It was intended simply as an argument against the plutonic and in favor of the organic origin of our iron ores. To illustrate this argument, I have given my views of the genesis of the more important deposits and varieties of iron ore found in this country. Other illustrations would doubtless have strengthened the argument, but it is already so well fortified that it hardly needs further confirmation.

THE TRIASSIC AGE OF SAND-ROCK CARRYING ORES OF COPPER AND SILVER, AND THE ORIGIN OF THESE ORES.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Though an assiduous reader of your JOURNAL for long years past, your issue of April 1st escaped my attention until, on my return to New York, it was laid before me as requiring such on my part. Professor J. S. Newberry, in that issue, has such kind words as "an ingenuity of misapprehension or an audacity of misstatement" to apply to some of my contributions to your JOURNAL.

To have it ascertained beyond doubt whether Professor Newberry has a vested claim to infallibility and priority in geological matters to a degree that any claim to the contrary should be abused and suppressed, is certainly of interest to the profession, and therefrom I derive my justification for a few words in reply to the Professor's amiable utterances.

In your JOURNAL of August 7th, 1880, page 88, after quoting more than half a column from a report of Professor Newberry, I stated as follows:

"In this description, Professor Newberry classifies as 'Lower Cretaceous' the '*massive*' sandstones '*now forming hills and cliffs of considerable hight*,' which, though very distinct from those described in Section 4, are those carrying the copper ores, and including strata of conglomerate. This is an error, which he himself in part corrects on the next page but one to the above description, in stating: 'In the coarse yellow sandstones and conglomerates overlying the red beds of the Trias, I find large quantities of the sulphide of copper replacing trunks and branches of trees, just as at the Cobre, near Abiquiu.'* At Abiquiu, Professor Newberry determined, in the shale roof of the sand-rock carrying copper ore, '*Otazamites*' and '*Pterozamites*,' both being (as I suppose) decidedly Triassic. But further evidence for the Triassic origin of these cliffs consists in their being ripple-marked on all sedimentary faces, and in the fact that the copper ore itself consists in '*Podozamites crassifolia*' (Newb.), which might well be called a *palm*, it lacking neither the longitudinal cleavage nor any other of the palm's essential qualities.

"The economic importance of this sandstone—which was classified in my report, published in the ENGINEERING AND MINING JOURNAL of May 5th, 1877, as Permian (unless there be two strata of sand-rock carrying copper ores, one Permian, the other Triassic), as Prof. G. W. Maynard, in your issue of June 12th, 1880, classifies the apparently similar sand-rock carrying the characteristic ores of copper, jointly with those of silver, of Silver Reef, Utah—imparts a peculiar interest to the question of its geological age. I therefore may be permitted to draw attention, as far as New Mexico is concerned, to the existing close connection between these sand-rocks and the eruptive trap, which covers, or has covered in the past, the surrounding country, and even the slopes of the Nacimiento Mountains, for hundreds of square miles, forming to-day in the very valley of the Rio Puerco the caps of bold buttes (Cabezas, and others).

"It is true that to-day it is an adopted dictum, that the trap of New Mexico overlies the Lower Cretaceous. But further study will prove that the underlying sand-rock is Triassic, and that between the Lower Cretaceous and the Upper Triassic there is no other interposition here than the volcanic trap, and that this trap has, in New Mexico and Utah, had a metal-creating influence on the Upper Triassic sand-rock, as it has had in Connecticut and New Jersey, and that these Triassic sand-rocks will become the source of an enormous product of metals, fine and base."

More than two months later, Professor Newberry, in your issue of October 23d, has the following to say on the same subject:

"These questions are, 1st. What is the geological age of the silver-bearing sandstones? 2d. What is the source of the impregnation?

"The first of these questions has been left unanswered by all who have written on the geology of the district; but I was able to obtain conclusive evidence that the sandstones are of Triassic age, and are a part of the great sheet of Triassic rocks which extends through Southeastern Utah, Southern Colorado, New Mexico, the Indian Territory, etc. In the Cedar Mountain, which reaches down from the north nearly to Silver Reef, I found the complete succession of the rocks of this region—Carboniferous, Permian, Trias, Jura, and Cretaceous, each containing its characteristic fossils. I also found some representatives of the sandstones which form the reefs everywhere present in the Triassic group, and everywhere containing silver and copper. The question is then finally settled."

A careful re-reading of Professor Newberry's report of 1859, referred to by me, developed the fact that it does not contain a single line beyond those quoted by me, by which the author classifies the copper ore-bearing sandstones as "Triassic," and those quoted prove that the author then considerably confused the Cretaceous and Triassic sandstones.*

I therefore was well sustained in my statement in the JOURNAL of December 11th, page 381:

"The corroboration of my views concerning the Triassic age of the copper-bearing sandstones of New Mexico and Utah by so eminent a geologist as Prof. J. S. Newberry encourages me to raise another issue with this learned gentleman, namely, that of the origin of the ore-deposits."

Nevertheless, Professor Newberry writes in your issue of January 1st:

"In the first place, Mr. Cazin speaks of my corroborating his views of the Triassic age of the copper-bearing sandstones of New Mexico and Utah; whereas, in my description of the old copper mines of Abiquiu, the Triassic age of the copper-bearing sandstone is distinctly and repeatedly asserted as proved by the fossil plants associated with the copper. A re-reading of the description of the Abiquiu copper mines and the other numerous references to copper in the Triassic rocks, contained in my report of 1859, will show Mr. Cazin that, so far from *my* corroborating *his* view of the Triassic age of the copper-bearing sandstones, he merely reiterates the statements made in my San Juan Report more than twenty years ago."

Now to the question of the origin of copper and silver in the Triassic sandstones. In your issue of October 23d, page 269, Professor Newberry states:

"I am now inclined to believe, however, that the silver, like the copper which the sandstones contain, was deposited with them and not introduced subsequently."

And in your issue of December 11th, page 381, I made the counter statement:

"Whatever copper or silver is found in the Triassic sandstones shows, in the one case, organic matter by its form; or in the other, occurs as an impregnation,† consisting of such minute particles of either that they, by the unalterable law of nature, could not have been deposited as sediment from water simultaneously with the coarse sands forming the Triassic rocks, and this constitutes the physical impossibility heretofore alluded to."

Professor Newberry sets this contradiction aside as follows (January 1st, 1881, page 5):

"The physical difficulty which Mr. Cazin says would prevent the deposition of the ores with the coarse sand exists only in his imagination; for the ores of silver and copper plainly existed as solutions which saturated the sand when it was collected, and deposited the sulphides with sandstone after the mechanical action which transported the sediment was at an end. All this, however, was within the Triassic age, while the water was shallow and highly charged with mineral matters."

Is the precipitation of sulphides from solutions containing sulphates a physical action, or is it a chemical action? This chemical action was well specified by me in the following words (December 11th, 1880, page 381):

"Copper and silver have been in solution in the sea from which the Triassic sandstones were deposited, as copper and silver are in the seas of the present day. Organic matter was deposited with the sand at present forming the Triassic sand-rock, in this case near the shores of such sea (ripple marks), and the organic matter was changed by the influence of the sea-water, under which it remained for many thousands of years (shown by superaccumulated formations), into sulphides of copper and silver."

Can all action, even when belonging to the Triassic period, depositing from 3000 to 5000 feet of rock, be called "simultaneous;" especially so, when the necessity of chemical alteration lies between the one and the other fact? Can the deposition of solids and their subsequent metamorphosis by chemical action be called "simultanous"?

Your readers may judge for themselves where, in the two cases shown, there have been "ingenuity of misapprehension and audacity of misstatement."

As far as I am concerned, these remarks close the discussion, as I confess myself unable to fully apprehend the force of my adversary's arguments.

Respectfully, F. M. F. CAZIN, M. and C.E.

THE RAND DRILL COMPANY.—The office of this company will be removed on the first of May to 240 Broadway, opposite City Hall Park.

THE ATCHISON, TOPEKA & SANTA FÉ RAILROAD.—The annual report gives the gross earnings for the last year as $8,556,975; all expenses, including 7½ per cent for dividends, $7,485,824; balance, $941,716.

* I might at the time have drawn attention to the fact that Professor Newberry's self-correction referred to is one of fact stated, but none of conclusion drawn, because numerous sentences in the same report prove, to full evidence, that the author had no clear perception of the geological range where the sand-rock carrying sulphide of copper, replacing trunks and branches of trees, could be found. On page 68 of his report, Professor Newberry states, "The copper occurs on the *base* of the yellow sandstones *just above the marls*," the same as on page 117 (above quoted); on page 118, the copper is stated to occur *near the junction of the Trias with the Cretaceous*; and on page 71 these sand-rocks, *just above the marls*, are stated to be the *base of the Cretaceous*; and the sole intimation of a proper classification of the ore-bearing rock is to be found in a foot-note to the description of the "cobre" at Abiquiu, hereafter alluded to.

* The discussion, on pp. 48-49, whether "Walchia" or "Voltzia," leaves the matter absolutely unsettled, while much has been quoted to show that the author then inclined to consider the ore-bearing rock as "Cretaceous."

† The following expression of Professor Newberry (ENGINEERING AND MINING JOURNAL January 1st, page 5), when compared with the above, shows indeed some audacity of misstatement and ingenuity of misapprehension: "While on the subject, I must correct one or two other errors which Mr. Cazin has fallen into with reference to the Abiquiu copper. He says that the precipitation of the ore is only upon animal and vegetable matter; whereas it is often concretionary, like the clay iron-stones of the Coal Measures."

THE ADVANCE IN MINING AND METALLURGICAL ART, SCIENCE, AND INDUSTRY SINCE 1875.*

By William P. Shinn, Pittsburg, Pa.

It seems proper to present in the *Transactions* of the Institute, from time to time, formal record of the advances made in the arts and sciences to which our organization is devoted—milestones in the highway of progress—from which our successors may measure what they in their turn have gained.

The admirable address of the Hon. Abram S. Hewitt, then president-elect of the Institute, on "A Century of Mining and Metallurgy in the United States," read at the opening of the meeting held in this hall in June, 1876, forms a point of departure, and the conclusion of the eighth decade of the nineteenth century and the end of the first five years of our country's second century seems to offer a fitting time for again making up our record.

The period since 1875 has been marked by a degree of activity in mining and metallurgical industry never before equaled in our history, while the progress made in the science and art has been, if possible, still more noticeable. Whether we consider the mining of iron, ore and coal or of the precious metals—the advances made in smelting the former and in reducing the latter, the extraordinary increase in the production of Bessemer steel, or the science of Thomas and Gilchrist, which makes the hitherto rejected phosphorus the corner-stone of success—the past five years are alike noticeable for the progress they have shown, and to some of the most marked features of this progress I will now briefly call your attention.

It may be of interest in this connection to note the following figures, showing the growth of the population of the United States during the last three decades:

Year.	Population.	Increase.	Per cent.
1850	23,191,876	.....	....
1860	31,443,321	8,251,445	35·6
1870	38,558,371	7,115,050	22·6
1880	50,300,000	11,741,629	30·5

The table appended shows the yearly production of the leading minerals and metals during the ten years ending with 1880.

COAL.

As coal is the very foundation of our craft, I will first consider what has been done in its development. The known area of useful and workable coal in the United States has been greatly extended since 1875 by discoveries in Utah, Colorado, Indian Territory, and New Mexico, good coking coals having recently been found in the two latter, which seem destined to open these territories very rapidly to metallurgical industry.

A comparison of the production of anthracite coal during the last five years with that of the preceding five years shows that there was mined of anthracite coal:

	Gross tons.
In 1871-1875	104,655,254
In 1876-1880	111,482,727
Increase	6,827,473
	or 6·51 per cent.

The great increase in the capacity for its production is shown by the output for 1879—27,711,250 gross tons—being 4,830,339 in excess of the largest previous output (that for 1873), or 21 per cent.

The total coal production of the United States is thus stated in gross tons:

	Anthracite.	Bituminous.	Total.
1870	13,985,930	15,231,698	29,217,628
1875	20,654,509	26,031,726	46,686,235
1879	27,711,250	33,665,709	61,376,959

showing an increase from 1870 to 1879 of 109·7 per cent, of which two thirds occurred since 1875.

The past five years have witnessed many improvements in the mining and handling of coal; notably in restricting the waste in the preparation of anthracite and in utilizing the culm, whether by apparatus for burning it in its natural condition, such as that of Mr. John E. Wootten, applied to the engines of the Reading Railroad, or by forming it into bricks, in combination with clay or tar, as is done by the Delaware & Hudson Canal Company, and used on their locomotives. Machinery for washing bituminous coal for coking has been greatly improved, and a practicable arrangement has been devised for burning pulverized fuel which promises well. It is in the preparation by comminution, or by reduction to gas, that further economy in the use of fuel is to be looked for.

PIG-IRON.

The production of pig iron in the United States for the periods named aggregates as follows:

	Gross tons.
1871-1875	11,233,424
1876-1880	12,813,814
Increase	1,580,390
	or 14·07 per cent.

The production for 1880 is reported by Mr. James M. Swank as 3,835,191 gross tons, an amount 50 per cent greater than the production of 1872 and 1873, and over double that of 1876.

We are accustomed to regard the five years 1874–78 as years of great depression to the iron industry, and yet the product of pig-iron for those years was 10,652,836 tons while it was for the ante-panic years, 1869–73, 10,192,933 tons, showing an increase of 459,903 tons, or 4·51 per cent, in the five panic years, over the production of the best five consecutive years ever known to the iron trade of this country.

The use of regenerator stoves with blast-furnaces of large hearth area has opened a new era in the history of blast-furnaces, evidenced by the product of the furnaces of the Edgar Thomson Steel Company, Limited, their "B" furnace of 20 feet bosh by 80 feet high, having averaged upward of 140 tons per day during a blast of seven months, and having made 208 tons in 24 hours. That large blowing, combined with high heating capacity, in furnaces having large hearths, will result in still greater production, with less consumption of fuel per ton, seems assured in the early future.

IRON ORE.

The production of iron ore has received an impetus in the increased production of pig-iron, shown by the increased production of the Lake Superior region, as follows. The output for the five-year periods before referred to shows as follows:

	Gross tons.
For 1871-75	4,779,114
For 1876-80	6,453,092
Increase	1,673,978
	or 34 per cent.

The production for 1880 reached 1,975,602 gross tons, an amount exceeding by 800,000 tons the largest year's output prior to 1876, and by 560,000 tons the greatest production of any previous year—that of 1879.

WROUGHT-IRON.

There has been a material advance in the production of the various forms of wrought-iron, and some decided improvements in the economy of its production. The ordinary consumption of fuel per ton of iron puddled has been 3000 to 3200 pounds; but the Swindell regenerative furnace puddles a ton of iron with 1250 pounds of slack coal. Experiments now being made on a new revolving puddler promise even better results than this.

STEEL.

In the production of Bessemer steel, there has been an increase as unexpected as it is extraordinary, whether considered in its commercial aspects or as the result of the skillful handling of machinery originally designed for a much smaller output; for it must be considered that up to the end of 1880 there has been no increase in number and very little in the size of converters since 1876. The output of Bessemer steel ingots was for the five years:

	Net tons.
1871-75	907,060
1876-80	3,950,954
Increase	3,043,894
	or 333 per cent

The product of 1879 was 928,972 net tons, or 21,000 tons in excess of the five years 1871–75, while that for 1880 was 1,203,173 net tons, an amount greater than the output of any two years prior to 1878.

The output of ingots of some of the leading steel-works during 1880 is reported as follows:

	Gross tons.
Edgar Thomson	123,303
Cambria	122,143
Joliet	116,750
Lackawanna	105,354
North Chicago	100,178

Of steel rails there has been a more than proportionate increase, due to greater economy in the production, whereby a slightly larger percentage of rails has been obtained from the ingots than was previously done. The product for five years was:

	Net tons.
1871-75	697,142
1876-80	3,046,584
Increase	2,349,442
	or 335 per cent.

The steel rails produced in 1879 were 683,964 tons, nearly equal to the five years 1871–75, while for 1880 there were made 967,592 tons, or 40 per cent in excess of that five-year product.

The steel-casting process first adopted at Terrenoire is about being introduced by Mackintosh, Hemphill & Co., Limited, of Pittsburg. The manufacture of steel castings is a growing industry, and bids fair to increase very rapidly.

The Krupp process of washing out phosphorus is in successful operation at the Springfield Iron Company's works, at Springfield, Ill., and promises well in connection with the open-hearth process.

The Thomas and Gilchrist basic process is a commercial success abroad, and will doubtless soon be introduced in this country in new plants now being constructed with Holley's plan for changing vessel shells.

Improvement in the quality of Bessemer steel is to be looked for in the direction of allowing time for the steel to settle, the ingredients to become more thoroughly distributed, the fine particles of slag to rise to the surface, and the free oxygen to escape before casting it into ingots. The question of the removal of the occluded gases from steel is also attracting attention abroad, and appears likely to affect very materially the quality of the ingot metal of the future. One of Edison's experiments with platinum wire, effecting what he calls the removal of the contained air, but which was evidently the removal of the occluded gases, raised the melting-point of the wire to double its original temperature, and increased its light-giving capacity eight times.

It is stated that the Wheeler process of rolling steel scrap in an iron casing is being utilized at Chester, Pa., in the manufacture of ship plates.

RAILROADS.

Much of the increased output of iron ore, pig-iron, and steel rails is due to the demand created by the construction of railroads, of which there have been 19,397 miles constructed since 1875, and of which 7150 miles were built in 1880, an amount nearly equaling the mileage of 1872, which was 7340 miles.

GOLD AND SILVER.

The product of the precious metals for the periods named compare as follows:

GOLD.

1871-75	$197,662,244
1876-80	196,690,603
Decrease	$971,641

SILVER.

1871-75	$133,607,510
1876-80	206,210,848
Increase	$72,603,338

The product of the two precious metals showing an increase of $71,631,697.

The great increase in the output of silver is largely due to the great

* Annual address of the President of the American Institute of Mining Engineers. Read at the Meeting of the Institute, February, 1881.

carbonate deposits of Colorado, the product of the Leadville mines in 1879 being $10,189,521, and in 1880, $15,095,153.

PETROLEUM.

The mining product showing the greatest increase in output is petroleum, which was:

	Barrels.
In 1871–75	41,911,367
In 1876–80	83,042,121
Increase	41,130,754

or nearly 100 per cent.

The production in 1880 reached the enormous total of 26,032,421 barrels, compared with which the greatest year's output prior to 1876 was 10,910,303 barrels in 1874.

MACHINERY.

There have been great improvements in mining and metallurgical machinery during the last five years, prominent among which may be mentioned the Porter-Allen high-speed engine for rolling-mills; the Leavitt compound engine for pumping and hoisting, of which the Institute saw good specimens in its visit to Calumet & Hecla during the Lake Superior meeting; the Bulkley condenser, which is coming into general use for rolling-mill and blast-furnace engines; and the Kloman eye-bar universal mill, for producing weldless eye-bars of iron and steel, the only process so far used adapted to eye-bars of Bessemer steel.

GENERAL REMARKS.

Of course it would be presumptuous to claim all of this improvement to the operations of this Institute, and yet I have no hesitation in saying that a considerable proportion is due to our members; first, as regards the quantity of output; and second, as regards economy of production—more especially the latter. We all know that to several of our members are due the great improvements in the increase of output in the Bessemer process, and to the work and thoughts of others are due many other advances in the metallurgical arts. I trust that my successor five years hence may be enabled to give as good an account of the next five years as I have of the five just past.

ANNUAL PRODUCTION OF LEADING MINING AND METALLURGICAL PRODUCTS, DURING THE TEN YEARS 1871–80.

Years.	Anthracite coal. Gross tons.	Pig-iron. Gross tons.	Bessemer steel ingots. Net tons.	Steel rails. Net tons.	Gold.	Silver.	Petroleum. Barrels.	Lake Superior region. Ore. Tons.	Lake Superior region. Pig. Tons.
1871	17,379,355	1,707,085	48,850	38,250	$35,898,000	$20,286,000	5,795,000	813,379	51,225
1872	22,084,083	2,539,783	120,108	94,070	39,458,459	20,527,500	6,539,103	932,055	61,195
1873	22,880,921	2,560,962	170,652	129,015	40,456,593	28,252,100	9,879,455	1,167,379	70,507
1874	21,667,396	2,401,261	191,633	144,944	40,103,045	30,498,000	10,910,303	935,488	86,494
1875	20,643,500	2,023,733	375,517	290,863	41,745,147	34,043,910	8,787,506	910,840	81,753
Five years	104,665,254	11,233,424	907,060	697,142	$197,662,244	$133,607,510	41,911,367	4,779,141	351,174
1876	19,000,000	1,868,961	525,996	412,461	$44,328,501	$41,506,672	8,068,906	977,233	61,911
1877	21,323,000	2,066,594	560,587	432,169	45,300,000	46,075,000	13,135,671	960,982	29,085
1878	18,600,000	2,301,215	732,226	550,308	41,000,000	40,000,000	15,163,462	1,123,093	17,404
1879	27,711,250	2,741,853	928,972	683,964	38,623,612	19,741,661	1,414,182	30,583	
1880	24,848,477	3,835,191	1,203,173	907,592	40,005,364	26,032,421	1,975,662	48,502	
Five years	111,482,727	12,813,814	3,950,954	2,986,494	$209,257,477	$173,355,754	40,257,883	3,140,393	138,404

MAINE MINING NEWS.

Special Correspondence of the Engineering and Mining Journal.

The work of smelting has begun at the Douglass mine. One cupola furnace was in operation all last week, and the second one was started on Friday. The chimney for the reverberatories is finished; one reverberatory, the second, is done, and the other well under way; so, in a short time, we shall see ingot copper turned out. Every thing about the mine and works looks finely. DIRIGO.

BLUE HILL, ME, April 25.

Renewed activity is observed among our mining men, and most of our stocks are firm and on the rise, with the exception of those on the Sullivan lode, which had a sudden fall, occasioned by a meeting of the directors of the Sullivan & Waukeag mine, when it was proposed to make small assessments on the stock—three dollars a share—and use the proceeds to erect a larger and more efficient plant at the mine, and to enable them to continue work on a much larger scale; but as the mine is already in a paying condition, and the people have invested in the stock with the understanding that it is full-paid, it is to be hoped that the directors and stockholders at the special meeting called for May 8th, at Kittery, Me., will decide to continue the mine as at present.

The Sullivan & Waukeag continues its weekly shipments of bullion. On the 23d, three more bricks were forwarded, weighing about 900 ounces each.

The Milton is making rapid progress in both drifts, and expects in No. 1 soon to strike the Sullivan vein, as it has found a much softer rock containing stringers of ore, showing that the vein can not be far distant.

The Golden Circle has finished timbering the incline, and begins work again this week in the bottom of incline.

The Grant is encountering stringers of better mineral than has ever been taken out of the mine before, and is confidently looking for the vein to appear in the drift in a few days.

In Blue Hill, considerable excitement prevails over the trial-run of the Douglass Smelting-Works last Wednesday, which resulted in the production of over a ton of copper.

The Blue Hill and Twin Lead smelting-works will also be in running order soon. DOUGLASS.

ELLSWORTH, ME., April 25.

THE METER IN PRACTICE.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have just read in your issue of the 16th inst. the article on the "Meter in Practice," by Mr. B. E. Fernow. If this article had been written by myself, it could scarcely express my views with greater accuracy. My experience has been very similar to his, and with one exception, I heartily indorse his views. My exception is simply that I do not think, because "so many countries have adopted this standard," that this is any reason why the United States, or any other English-speaking country, should adopt it. Yours, ISAAC NEWTON.

NEW YORK, April 23.

COLORADO COAL.

The Denver *Republican* says: There are not many people who appreciate the importance of the coal trade of Colorado. It is true that, without the mines and the cattle, the coal would be useless. Yet the coal-fields, with the increasing demand for the fuel, promise to grow steadily in importance. At present, the output of coal is not by any means up to the full capacity of the developed mines, and there are numerous coal-fields which, as yet, can hardly be said to be worked, as their production is only for the immediate vicinity, without railroads at hand to transport the product to the city markets.

To get at some estimate of the growth of this coal-mining industry, a reporter for the *Republican* visited the various coal agencies in the city to get figures as to the amount of coal used in the city of Denver alone. Some of the agents seemed unwilling to give any figures, for reasons best known to themselves. The figures obtained were as follows:

	Tons.		Tons.
Cañon (Colorado Coal and Iron Company)	71,500	Mitchell	12,000
Marshall	25,146	Boulder Valley	12,000
Star	15,000	Superior	12,000
		Stewart	5,000

This does not include the Trinidad or El Moro mines, which have no agency here, the orders being sent directly to Trinidad. Of the Fox, Welch, and Jackson, we have no report. We have, however, a report of shipments of coal into Denver from the northern coal-fields, as follows:

	Tons.		Tons.
Marshall	4,740	Welch	1,000
Star	2,800	Fox	983
Mitchell	1,300	Jackson	971

To get at an idea of the comparative sales of the various months, the Marshall sales in Denver are here given for the colder months:

	Tons.		Tons.
October	2,350	January	3,210
November	3,146	February	3,200
December	4,740	March	2,400

The summer months averaged somewhat over 1000 tons per month.

With these figures, an estimate is formed that the annual shipments into Denver are some 200,000 tons or over, which would be an average daily consumption of about 600 tons. The heaviest consumption was in December, and taking the December figures given above, an estimate can be formed that the average in December was about 1000 tons per day.

These figures are for Denver alone. The actual production of the mines is of course far above that, Denver having less than one fifth of the population of the State.

RAILROADS IN MANITOBA.—The approaching session of the Legislature of Manitoba will be called on to consider the following applications: For an act to incorporate the Winnipeg Southern Railroad Company, with power to build and operate a railroad beginning at Winnipeg and running thence southerly to the village of West Lynne, and with power to build a branch thereto, starting from the main line near the town of Morris, and running southwesterly into the Mennonite reserve in the southern part of the province; also, for an act to incorporate the Winnipeg & Southeastern Railroad Company, with power to build and work a railroad beginning at Winnipeg and running thence southerly to the boundary between Manitoba and the State of Minnesota; also, for an act to incorporate the Winnipeg & West Lynne Railroad Company, with power to construct and work a railroad from Winnipeg, running thence in a southerly direction to a point on the boundary between Manitoba and the United States, at or near West Lynne, and with power to build a branch westerly to the boundary between the province and the northwest territories; also, for an act to incorporate the Meadow Lea & Lake Manitoba Railroad Company, with power to build and work a railroad beginning at Meadow Lea Station on the Canadian Pacific Railroad, and running thence northwesterly to a point on Lake Manitoba at or near Lake Francis.

SANTA CLARA OR BARRANCA COAL MINES OF SONORA, MEXICO.

We abstract the following from a report made January 25th, 1881, by Dr. Charles McQuestin: These coal-fields are situated in the district of Hermosillo, jurisdiction of San Javier and Mineral of La Barranca, about 100 miles due east from Hermosillo City, and 120 miles N.E. from the port of Guaymas; also, four miles east of the Barranca mill and the town of Barranca, twelve miles east of the town of San Javier, and one and a half miles west of the Yaqui River, all in the State of Sonora, Mexico. The property consists of an extensive tract of anthracite coal. Two well-defined seams of coal have been exposed. The first or superficial vein is 9 feet 6 inches in thickness, underlying the northwest side of a mountain. This seam in many places has but a very slight covering of but from one to four feet in thickness, and is distinctly traced for one thousand feet horizontally on the side of the mountain and about five hundred feet in depth. Other croppings, supposed to be on the same seam, occur at many places for miles in an easterly direction. The dip of the vein is about 20° S.S.E. and the strike E.N.E. Twenty-two feet under the above-mentioned seam, another, 7 feet thick, is found. A tunnel has been run into this seam a distance of 50 feet to prove it. The coal so exposed is of the same quality as in the upper seam. The geological formation is probably S lurian or Devonian, and the coal is imbedded in slate.

The following is an analysis of the coal:

Fixed carbon	94	per cent.
Ash	4	" "
Moisture	2	" "
Sulphur	0	" "
Bitumen	0	" "
Specific gravity	1·77	

In burning it gives a short blue flame of carbonic oxide. It does not make "clinkers."

Mr. J. R. Schupman, of San Francisco, under date of January 13th, wrote a letter to Dr. I. S. Eshleman on the Barranca coal-fields of Sonora, Mexico, from which we glean the following: These coal-fields are reached from Tucson, Ariz., by going up the Santa Cruz River to the Rio Magdalena, by a very easy pass 4600 feet in altitude; thence down the Magdalena or San Ignatio to San Rafael del Alamito; thence across the low gravel mesa country to Hermosillo. From Hermosillo Mr. Schupman went through Subiate, Ticoripe, and La Barranca to the coal-beds. There is an easy outlet down the Rio Blanco to the Yaqui River. The coal-beds are opened at a point in a little cañon of Rio Blanco, two miles from the mining town of Turumari and three and a half miles from the Yaqui River. The coal strata are deeply bedded in somewhat altered slates, apparently of the transition period. These slates are bluish-brown in color, and very hard, except in the vicinity of the coal. The dip of the strata is about 36°. There are at least two distinct strata of coal lying vertically about 40 feet apart. The width of these veins has been exposed at four points. At one point, a drift has been run in on the upper vein, following it up a distance of about 90 feet. The tunnel opening into this drift is about 60 feet above the bed of the cañon. In this drift, the coal shows very uniform, perfectly clear of all slate or "bone," and measures 9½ feet in thickness. This stratum of coal is in the main covered only with the earth and gravel, on much of the hill-side not more than three feet deep. A hundred thousand tons and more could be taken from this vein without leaving the daylight. This vein is also opened at another point on the hill-side and in a shaft in the bottom of the cañon. At both of these points, it shows that it contains from 95 per cent to 97 per cent carbon and volatile matter, leaving less than 5 per cent free ash. In the fire-places at Turumari and La Barranca, it made excellent fires that lasted all night without replenishing. These discoveries can be approached by rail by two routes: one from Ticoripa by Obispo and Potrero by a small tunnel to overcome the summit, and thence down the cañon a distance of six miles; the other, from the mines down the cañon four miles to the Yaqui River, to intersect a railroad or to make shipments by the river.

PROGRESS IN SCIENCE AND THE ARTS.

The Isthmus Canal Project in 1521.—The San Francisco *Mining and Scientific Press* says that any one who thinks the idea of a canal connecting the Atlantic and Pacific a new one is mistaken. As long ago as 1521, a Portuguese navigator, Antonia Galvao, proposed to Charles the Fifth to make an interoceanic communication by the Panama route; and in 1780, Nelson proposed a canal through Nicaragua. Humboldt took it up in 1804. The first work actually done was in 1841, by Henry de Puydt, who moved a colony to Honduras to dig a canal. This colony went the way of so many that had preceded it. A few years later, Garilla and Courtinez were sent out by Guizot to study the matter, and pronounced the undertaking an impossibility. About the same year, Louis Napoleon was solicited by the Nicaraguan government to lend his name to the undertaking, and did actually make an appeal to the public in a pamphlet entitled *Le Canal de Nicaragua*. Thus it is that the isthmus has received a pretty fair pavement of good intentions.

Wickersheim's Process for the Preservation of Organic Substances.—The *Chemical News* gives the following, on the authority of *Biedermann's Central-Blatt für Agrikultur-Chemie:* The original formula was 100 c.c. water, 40 c.c. glycerine, 10 c.c. methylic alcohol, 3·33 grms. alum, 0·83 grm. common salt, 0·40 grm. saltpeter, 2 grms. potash, and 0·66 grm. arsenious acid. H. Struve and O. Jacobsen point out that the alumina will be completely precipitated by the potash, and propose in place of both alum and potash an equivalent quantity of potassium sulphate. The following two modifications of the fluid are now in use, the former for injections and the latter for steeping objects to be preserved:

Arsenious acid	16 grms.	12 grms.
Sodium chloride	80 "	60 "
Potassium sulphate	200 "	150 "
Potassium nitrate	25 "	18 "
Potassium carbonate	20 "	15 "
Water	10 liters.	10 liters.
Glycerine	4 "	4 "
Common methylic alcohol	¾ "	½ "

Action of Compounds Inimical to Bacteria Life.—Mr. W. M. Hamlet read a paper, on the 7th of April, before the Chemical Society of London, the conclusion of which is, that amounts of chloroform, phenol, and creosote, varying from ¼ to 3 per cent, do not destroy bacteria, although their functional activity is decidedly arrested while in contact with these reagents. "Bacteria may be pickled in creosote and carbolic acid without being deprived of their vitality." The author concludes that the substances which destroy bacteria are those which are capable of exerting an immediate and powerful oxidizing action, and that it is active oxygen, whether from the action of chlorine, ozone, or peroxide of hydrogen, which must be regarded as the greatest known enemy to bacteria. In his experiments, chlorine and hydric peroxide (about 7 per cent of a 5 vol. solution) were fatal to bacteria. The abstract of the paper, with modifying explanations, is given in the London *Chemical News* of April 14th.

The Relation of the Atoms of Chemical Elements to Electricity.—Professor Helmholtz, in his recent Faraday lecture, affirms that the atom of every chemical element is always united with a definite unvarying quantity of electricity. This quantity stands in close connection with the combining power of the atom, or its quantivalence. If the amount of electricity of the monad atom be taken as the unit, that of the dyad is two, that of the triad three, etc. Professor Helmholtz says: "If we conclude from the facts that every unit of affinity of every atom is charged always with one equivalent either of positive or negative electricity, they can form compounds, being electrically neutral, only if every unit charged positively unite under the influence of a mighty electric attraction with another unit charged negatively. This ought to produce compounds in which every unit of affinity of every atom is connected with one—and only with one—other unit of another atom. This is, indeed, the modern chemical theory of quantivalence, comprising all the saturated compounds."

Fixing the Position and Distance of Objects by the Eyes.—That persons having the use of one eye only can estimate distance nearly as well as those having two eyes, is a well-known fact. Where a person has lost the sight of one eye, the power of judging by the other has to be acquired. Two things, says Professor Helmholtz, have here to be taken into account—first, the appearance of the objects in relation to other objects; and secondly, the parallax of motion. The outlines of the more distant objects are always covered by those of the nearer ones where they cross, and hence the difficulty of recognizing that the image projected by a convex lens or a concave mirror is nearer to the observer than the lens or the mirror. Further, the object projecting a shadow on any surface always lies before that surface. These two things make up the appearance of the objects, and they are rarely overpowered by others; for example, stereoscopic combinations, as is demonstrated by Dove's pseudoscope, composed of two rectangular prisms, and showing to each eye a reflected image inverted from right to left. The parallax of motion is seen as a shifting of the object, especially if it is near, on moving the head from side to side, or up and down. This element also overpowers the stereoscopic combination of the images of the two eyes.

The Horse-Power of the World.—It has been estimated that, in 1878, on the 270,000 miles of railroad, there were at work 105,000 locomotives, of an aggregate 30,000,000 horse-power, while the total number of engines amounted to 46,000,000 horse-power. Taking the nominal horse-power at an effective force equal to that of three horses, and the work of a horse as equal to that of seven men, it will be seen that the steam-engines represent the force of nearly 1,000,000,000 men, which is more than double the amount of workers on the face of the globe. The steam-engine, which is fed by coal, has, therefore, tripled the productive power of man.

CHINA AND JAPAN.—The steamship Oceanic arrived at San Francisco April 17th from China and Japan. She reports several official changes in China, showing that the Chinese government has lost none of its interest in the Kuldja question. The extensive coal-fields northwest of Tien-tsin are to be worked by the Chinese government. The French are gradually completing arrangements for the annexation of Tonquin, the junction of which with the French colony of Cochin China is likely to be effected before the end of the year. Advices from Japan report dissensions in the cabinet at Tokio, because of the conciliatory attitude of the imperial government toward China. It was expected that the Nitsu Bishi Mail Steamship Company would soon take possession of an important coal mine near Nagasaki, and thus have a monopoly of the coal trade of Japan, and thereby, in great measure, prevent foreign steamers from running in opposition on the coast. Over 65,000 people visited the National Exhibition at Tokio during its first fifteen days.

CONSOLIDATION OF IRON COMPANIES.—An important business occurrence at Plattsburg, Clinton County, is the consolidation of the Chateaugay Iron Company, the Chateaugay Ore Company, and the private manufacturing interest of Andrew Williams. The consolidated company has been formed with a capital stock of $1,500,000. The property includes the Chateaugay ore-bed, the Bellmont forge, and about 50,000 acres of land, the Chateaugay Railroad, the Gardner tract of timber land, with its kilns, forges, and buildings, 20,000 acres of timber at Clayburg and Russia, and the interest in the blast-furnace at Plattsburg. The Hon. Andrew Williams and the Hon. Smith M. Weed are the largest individual shareholders, and associated with them are Thomas Dickson, President of the Delaware & Hudson Canal Company, Le Grand B. Cannon, and others. It is expected that large iron manufactories will be erected in Plattsburg, and that the prosperity of the place will be materially increased by the consolidation. The new company will take possession of the property about May 1st.

SINALOA & DURANGO RAILROAD.—An American company has been formed to build a line of railroad in Mexico to be called the Sinaloa & Durango Railroad. It is to extend from Altata on the Gulf of California, 120 miles north of Mazatlan, to the city of Durango, in the State of the same name, a distance of about 220 miles. At Durango, it will connect with the Mexican Central Railroad, which will extend from the City of Mexico to the American frontier at El Paso. It is proposed to begin at once the construction of forty miles of the new line from the port of Altata to Culiacan, the capital of the State of Sinaloa. Surveying parties

will leave New York in a few days for the purpose of running the line from Culiacan to the plateau of Durango. The company has received a valuable concession from the Mexican government, which has granted also valuable privileges. It was organized in Boston, and the capital stock has been already subscribed in New England and New York. The officers of the company are: President, Thomas N. Hart, Boston; Vice-President, Robert R. Symon, New York; Treasurer, S. W. Richardson, Boston. E. P. North has been appointed chief engineer and general superintendent. The country which the new road will traverse is said to be one of the very richest in minerals in Mexico. The mines in the Sierra back of Culiacan now produce annually between $3,000,000 and $4,000,000 in gold and silver. The district of Culiacan is well adapted to the cultivation of sugar, which has been recently introduced with great success. Altata is the port of shipment for Brazil wood and other products of the State of Sinaloa. The richer grades of crude ores are also shipped largely at that port to Swansea and Germany. There is great depth of water in its harbor, but the entrance to it is narrow.

GENERAL MINING NEWS.

ARIZONA.

From our Arizona exchanges we condense the following:

CENTENNIAL.—Work was resumed at this mine on the 19th, a contract having been let to sink the shaft 100 feet deeper. The present depth is 212 feet, with a good showing of ore in the bottom.

SANTA RITA MINES.—A correspondent of the *Citizen*, in speaking of the development of the copper properties in the Santa Rita Mountains, says: For some years back, it has been generally known that this range of mountains contained large deposits of copper, and many locations were made in the hope of their being sought by capitalists. Until the completion of railroad communication, however, this branch of mining hung fire, and it has only been within the last six weeks that life and vigor have been imparted to the district by the bonding of quite a number of claims by Mr. R. G. Leckie, managing director of the Orford Nickel and Copper Company, of Capelton, Quebec, Canada. This gentleman has taken hold of these properties with the desire and determination to work them for what they are worth. He has already commenced the work of development, and has started with a force of about 30 men on several of the claims, several of which are showing up well and encouraging further and fuller efforts to see what is below.

WIDE AWAKE.—This company has a mill at the Gem mine, three miles from Pinal, which will shortly be in full operation. The machinery is of the latest improved pattern. There are ten stamps, a rock crusher, and gold riffles, a 25 to 27 horse-power engine, and a water-tank of 2000 gallons capacity. The mill is expected to work about eighteen tons per day of gold ore from the ledge, four feet wide, of the Gem mine, averaging in value, it is stated, forty-five dollars, at a cost of about six dollars per ton for mining and milling.

CALIFORNIA.

THE BODIE DISTRICT.

We are indebted to the *Free-Press* of the 19th inst. for the following review of the operations in these mines for the week ending April 16th: The rapid advance in Bulwer has been caused, in part, by the very favorable formation into which the west drift of the Standard, 1000-foot level, has penetrated; but the advance was due to the marked improvement in the west cross-cut from the south drift, 200-foot level, Ralston ledge, in Bulwer proper, the cross-cut being now 109 feet. The Bodie is drifting south toward the Mono line, in rich ore, at depth, while Bodie itself is looking well throughout. Concordia has concentrated all its working force in the north drift of the large east vein, which is showing great improvement. Oro is getting into its ore-veins on both the 440 and 520-foot levels, and hence the stock is very sensitive. Both of the Noondays are showing marked improvement. Rumors continue to be circulated about a "strike" in Standard; but the first strike expected is in the west cross-cut, 1000-foot level, which has, if the veins keep the regular pitch shown in the upper levels, to go from 100 to 140 feet farther before it reaches the ore veins. The indications in that direction, however, are favorable that the veins have changed their pitch, and that they may be cut into at any hour. The new hoisting-engines of the Standard were steamed up yesterday, and the mine and mills will probably be shut down for two or three days during the week (underground work, except hoisting, being continued as usual), in order to reel the new cables, tear away the old gallows-frame, etc. Black Hawk is experiencing some trouble from water, but the east cross-cut, 800-foot level, is in very favorable formation, indicating the close proximity of the east vein. The flow of water from the east cross-cut, 982-foot level, of the Tioga, is diminishing; but work has not been resumed in that direction, all efforts being now concentrated in the west cross-cut, same level, where the formation indicates a near approach to an ore-body. The Lent shaft is down 550 feet, is still free from water, and the rock is breaking better. The Red Cloud shaft is down 351 feet, and the sinking-pump is handling the water with ease, although the flow is steadily increasing. The Boston Consolidated has concentrated its whole working force in the shaft, which will be pushed down to the 400-foot level with all possible dispatch.

COLORADO.

CLEAR CREEK COUNTY.

LUCERNE.—The foreman of the Lucerne Mining Company informs a reporter of the *Register-Call* that negotiations are pending for the purchase of that portion of the Lucerne lode in Idaho Mining District belonging to ex-Mayor Hartman, of Black Hawk. The Lucerne east shaft gives a much better showing at the present time than ever before.

GILPIN COUNTY.

RARA AVIS.—The superintendent of this company is engaged in placing a plant of machinery over the main shaft on the Whitney lode. The vein in the bottom of the shaft continues to improve as it is sunk. In addition to the mill-dirt, a very good crevice of smelting ore is coming in, which is widening with every foot of development.

GUNNISON COUNTY.

RUBY KING.—We learn from the Elk Mountain *Pilot* that there is a new shaft sinking on the Ruby King, a force of twelve men being now at work on that and in the tunnel. Ore is taken out of the mine now richer than any hitherto extracted.

LAKE COUNTY.

According to latest mail advices, the roads leading to the Leadville mines are yet almost impassable, and occasion much difficulty and expense in the shipment of ore from the mines to the smelters. This is caused by the melting of the snow on the side-hills, and is having its effect in the reduced output of many of the principal mines. The Leadville *Herald* says that a project has been started, by which a portion of this outlay may be avoided. A company is about to be organized in Leadville, to lay tram-roads from the principal mines to the smelters. The grade is such as to render such a scheme practicable, and one half the outlay now paid for hauling would render the enterprise largely profitable. The company to introduce this new improvement is already organizing, and has the capital assured to render it a success.

The fire in Fryer Hill workings still prevents operations on the New Discovery claim of the Little Pittsburg Company. An attempt was made on the 17th to reopen the shaft, but had to be abandoned in consequence of the gas. It is not probable that any further attempt will be made until next week. Two boilers are kept constantly at work pouring steam into the mine. At the Amie, but little is doing, except sinking the deep shaft. There is a great deal of water coming into the mine, and the pump is kept steadily running. The Big Pittsburg is keeping up its ore-shipments. Breece Iron has temporarily discontinued shipping on account of the bad condition of the roads. The bins and platforms contain large quantities of ore; and as soon as hauling can be resumed, the mine will ship 100 tons per day. Chrysolite has resumed shipping, and the condition of the mine is reported to be extremely favorable. The Leadville *Democrat* of the 24th inst. says of this mine: A visit through the mine yesterday showed great activity in all departments, and a great deal of very beneficial development-work has been done in the past thirty days. Such is especially the case to the north of the Roberts shaft, where good bodies of ore continue being opened, extending from the Little Chief line as far westward as the work has reached up to the present time. And while there are no extraordinary large bodies of ore, still the ore-chute now opening continues with great regularity, and maintains a very satisfactory thickness. In many of the drifts, the ore ranges from five to seven feet in thickness, while again, in others, it is found only in streaks of six inches to two feet. The ore-shipments for the past fortnight have amounted to about 250 tons, and now average about 35 tons per day. After the first of next month, the product will be materially increased, as the mine then will be in much better condition, and will admit of a larger ore extraction, at less expense, than now. Many of the old stopes in the vicinity of the Roberts shaft, and also other places in the mine, have recently been made more secure by the building of large cribs, and much other expensive but necessary work has been done. The Glass-Pendery is shipping largely, and has about 300 tons of ore in the ore-house. Leadville Consolidated is having considerable trouble with water; the mine is looking well and making small shipments, about three or four tons a day. The shipments from the Little Pittsburg, amounting to about ten tons per diem, are the products of shafts Nos. 2 and 6. The Matchless is producing largely, one settlement of 18 tons netting $28,000. Large bodies of rich ore are reported to be exposed in the mine. The Robert E. Lee is shipping from 30 to 40 tons per day. The Leadville *Herald* of the 23d says that the uprise to the north on the Matchless line has been made and a fine ore-body is found. This portion of the Lee has been before prospected, but the ore was of low grade and mostly iron. It is now demonstrated that the Lee workings were too low. This new strike in the Lee is of great importance, and opens a large new territory heretofore believed of little value. The connection is not yet made to the new shaft. A line-drift is driving from the Sliver connection to cut the new shaft, and a drift is also running south from the shaft to connect. When the new connection is made, and the new shaft is used to hoist from, the output will be largely increased.

SUMMIT COUNTY.

ROBINSON.—The Leadville *Herald* says: The Boston & Colorado Smelting-Works, at Argo, have received the full amount of ore, amounting to 2000 tons, from the Robinson mine at Ten Mile. The mine will hereafter turn out an immense product of ore. There is no trouble to break an almost unlimited amount, the mine is so largely developed and the ore-bodies all left standing. Heretofore, the trouble has been to get the ore out from the mine, but now that there has been a double track laid in the tunnel, this trouble is obviated.

SAN JUAN COUNTRY.

The Bessie Bascom, at Ouray, has kept 15 men at work all winter, and has now 250 tons of quartz-carrying ruby and brittle silver on the dump.

MONTANA.

Late Montana exchanges have the following:

ALICE.—All the levels, from the 100-foot to the 700-foot level, are producing ore. At the 600-foot level, the hanging-wall has not yet been encountered. Stopping has commenced in the 700-foot level or in the west drift, which is in 85 feet. The ore-vein is more compact at this point than in the levels above, and it is of a different shade from any rock taken from the upper levels, and samples higher up in the ounces.

MOULTON.—A decided change for the better in the rock in the bottom of the shaft has been noticed, and it is now much softer than heretofore, which will facilitate the dropping of the shaft with greater dispatch. Before the close of the week, 300 feet will be attained, and perhaps more. The south cross-cut on the 200-foot level has been driven in 20 feet.

NEVADA.

COLUMBUS DISTRICT.

NORTHERN BELLE.—We are indebted to the Candelaria *True Fissure* of the 16th inst. for the following report of the operations of this company: The cross-cut from the fourth level drift has been advanced 18 feet during the week, and shows no change in formation. The first and second levels look very promising; in other respects, the shaft levels show about the same as when the last report was made. The eleventh or adit level continues to look well, and all the levels above show finely, especially the fifth and ninth, where there are fine bodies of ore. Every thing is running smoothly at the hoisting-works, and all work in the mine is progressing as usual. The daily product of ore is about 88 tons. Both mills are running steadily—mill No. 1, since the first of the month, on half-time. Bullion shipments for the week ending the 13th amount to $27,462.73; amount for April account to the 13th, $45,550.11.

MOUNT DIABLO.—The same paper says: The west drift on the third level shows no change. The advance has been 10 feet. The east drift from the third level still continues in favorable ground advance; 11 feet. The north cross-cut on this level shows good ore in the rise. The east drift has been driven 16 feet, and shows no change. On the second level, the drift in the foot-wall of the first winze west of the shaft is still in good ore. The north cross-cut on the second level is yielding good ore, and the west drift still shows a two-foot ledge of low-grade ore.

COMSTOCK LODE.

Official advices of April 16th are as follows:

ALTA.—During the past five days, have sunk and timbered the shaft 22½ feet; total depth, 1912½ feet. The porphyry character of the ground in the bottom has changed. No increase of water. The bobs will be in place next week.

CALIFORNIA.—During the past week, 585 tons of ore, assaying $27.80 per ton, have been extracted and sent to the mills. On the 2500 level, cutting out a chamber for the joint Ophir east winze. The joint Consolidated Virginia west drift to the C. & C. shaft has been extended 33 feet. The joint Consolidated Virginia east drift from the C. & C. shaft has been advanced 13 feet, and has been timbered to the face. Drill-hole No. 1 is in 100 feet.

CONSOLIDATED VIRGINIA.—During the past week, 508 tons of ore, assaying $26.70 per ton, have been extracted and sent to the mills. On the 2300 level, engaged in timbering up the south shaft. On the 2500 level, the joint California west drift to the C. & C. shaft has been extended 33 feet, and the joint California east drift from the C. & C. shaft has been advanced 13 feet and timbered to the face. The last drill-hole No. 1 has been advanced 103 feet.

MEXICAN.—On the 2500 level, cutting out a chamber for a winze in the joint Union Consolidated east cross-cut. The joint Ophir east winze has been sunk and timbered 14 feet. On the 2700 level, the joint Ophir east cross-cut has been extended 30 feet.

OPHIR.—On the 2500 level, cutting out a chamber for a winze in the joint Cali-

fornia east cross-cut. The joint Mexican east winze has been sunk and timbered 14 feet. On the 2700 level, the joint Mexican east cross-cut has been extended 30 feet. Repairing the incline at the 1900 station.

OVERMAN.—North drift, 2275 level, has been extended 47 feet; total, 352 feet. Formation same as at last report. Forman shaft has been sunk and timbered 20 feet; total depth, 1849 feet. Rock is very short and tough, and does not break well.

SIERRA NEVADA.—On the 2400 level, at east winze No. 2, the station is finished and the winze sunk seven feet. Uprise No. 1, west, has been advanced 40 feet. On the 2500 level, the north lateral drift has been advanced 50 feet; total length, 920 feet. The Joint Union Consolidated east winze has been sunk and timbered 19 feet; total depth, 56 feet. During the week, 209 1400-2000 tons of ore have been raised.

UNION CONSOLIDATED.—On the 2500 level, cutting out a chamber for a winze in the joint Mexican east cross-cut. The joint Sierra Nevada winze has been sunk and timbered 19 feet.

PROPOSALS AND SALES.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, the full name and address of parties soliciting, and the latest date at which they will be received:

Furnishing Labor and Material required for the Construction of a Stone Bridge on Agricultural avenue, in the West Park; Russell Thayer, Superintendent of Fairmount Park, Belmont, Pa.	May 2, 1881.
Furnishing Materials and Constructing the entire Works for the Norwich Water-Works; Cyrus B. Martin, Treasurer, Norwich, N. Y.	" 2, "
Furnishing, Fitting, and Delivering complete the Boilers for Hot Water and Steam, Tanks, Smoke-Stacks, Bath-Boilers, etc., required for the Heating Apparatus and Steam Supply of the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 2, "
Furnishing and Delivering and Putting in place all the Cast-Iron Frames, Casings, Trimmings, etc., for Doors and Windows, and Cast-Iron Washboards and Stair-Rings required for the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 3, "
Dredging in Secretary Creek and Treadhaven Creek, Maryland; William P. Craighill Lieut.-Col. of Engineers, U. S. Engineer's Office, 70 Saratoga street, Baltimore, Md.	" 3, "
Furnishing, Fitting, and Delivering complete certain Cast-Iron Work, consisting of Flanged Pipe, Coils, Covering Plates, etc., required for the Heating Apparatus of the North Wing of the Building for State, War, and Navy Departments; Office of Building for State, War, and Navy Departments, Washington, D. C.	" 5, "
Dredging 600,000 Cubic Yards of Material, in Upper Galveston Bay, Texas; S. M. Mansfield, Major of Engineers U. S. A., U. S. Engineer's Office, Hendley Building, Galveston, Tex.	" 9, "
Improvement of Harbor at Charleston, S. C.; Q. A. Gillmore, Lieut.-Col. of Engineers, U. S. Engineer's Office, Army Building, New York City	" 9, "
Continuing the Construction of Jetties at the Mouth of Saint John's River and at the entrance to Cumberland Sound, Fla.; Specifications, instructions to bidders, and blanks for proposals may be obtained at this office or from Lieut. W. L. Fisk, Jacksonville, Fla.; Q. A. Gillmore, Lieut.-Col. of Engineers, U. S. Engineer's Office, Army Building, New York City	May 10, 1881.
Construction and Delivery of Iron-Work needed for the Davis Island Dam, situated on the Ohio River, five miles below Pittsburg, Pa.; Approximate Weights, Wrought-Iron, 132 tons; Cast-Iron, 78 tons; William E. Merrill, Major of Engineers, U. S. Engineer's Office, Cincinnati, O.	" 12, "
Improvements at the following Harbors: Ontonagon Harbor, Mich.; Manistique Harbor, Mich.; Menominee Harbor, Mich.; Green Bay Harbor, Mich.; Kewaunee Harbor, Wis.; Two Rivers Harbor, Wis.; Manitowoc Harbor, Wis.; Sheboygan Harbor, Wis.; Port Washington Harbor, Wis.; Major Henry M. Robert, Corps of Engineers, U. S. A., U. S. Engineer's Office, 427 Milwaukee Street, Milwaukee, Wis.	" 13, "
Constructing 1600 Lineal Feet, more or less, of the new Breakwater at Cleveland, O.; John M. Wilson, Major of Engineers, U. S. A., U. S. Engineer's Office, Cleveland, O.	" 14, "
Constructing 280 lineal Feet of Pier at Ashtabula Harbor, O.; John M. Wilson, Major of Engineers, U. S. A., U. S. Engineer's Office, Cleveland, O.	" 14, "
Improvement on the Upper Mississippi River: 1. Constructing Brush and Stone Dams and Shore Protections between Reed's Landing and Wabasha, Minn.; 2. Construction of Stone Dams and Shore Protections above Winona, Minn.; 3. Dredging in the Galena River; 4. Constructing Brush and Stone Dams and Shore Protections at Andalusia, Ill.; 5. Completion of a Dam and Shore Protection of Brush and Stone at Alexandria, Mo.; 6. Dredging in Quincy Bay, Ill.; 7. Constructing Dams and Shore Protections of Brush, Stone, and Gravel, and Dredging at Hannibal, Mo.; 8. Constructing Dam of Brush and Stone at Louisiana, Mo.; A. Mackenzie, Captain of Engineers, U. S. Engineer's Office, Rockland, Ill.	" 20, "

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for gold..... $3.50	Assay for copper. $3.00	Assay for iron..... $4.00
" silver..... 3.00	" lead (wet)... 3 00	" nickel and
" gold and silver 5.00	" zinc..... . 5.00	cobalt 10.00

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to

ENGINEERING AND MINING JOURNAL, 27 Park Place, New York
(P.O. Box 4404).

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, April 29.

It is announced that a seat in the New York Mining Stock Exchange sold to-day at $2600, the highest price ever paid for one. This is evidence of a broker's appreciation of the current and prospective business in this market in mining stocks. Our tables show a very large business, and there is no question that a large part of it is legitimate.

If the Mining Stock Exchange as a body, or its members as individuals, will do all in their power to discourage investments in fraudulent and over-valued properties, there appears to be no limit to which their business can be extended. But if the public is continually influenced to purchase worthless or comparatively worthless stocks, it will very soon disappear from the market and leave the brokers to operate against each other. There is entirely too much operating on "points" that stocks are going up or going down, and too little judgment or knowledge shown of the true merits of the prosperity behind the stocks. The market has been weak to-day, but there is no evidence that it will continue so.

Alice has been very much neglected and a little weak; the sales amount to 200 shares at $7.75@$7.25. Amie has had a moderate business, at about steady prices, the sales aggregating 45,300 shares at 51@55@49c. Bassick records sales of 100 shares at $10. Belle Isle has ranged between 52@59@55c., with sales of 1775 shares. Bodie Consolidated has been quiet and a shade weak, the sales amounting to 735 shares at $3.13@$5.75. Breece has been steady, with sales of 600 shares at $1.40. California has had a very fair business at weak prices, the sales amounting to 8035 shares at $1.50@$1.30. Caribou has been a little more active and somewhat irregular, the sales amounting to 2500 shares at $2.50@$3.13. The indications favor an improvement in this stock. Cedar Tree has had a moderate business at steady prices, the sales amounting to 3400 shares at $2.60@$2.70@$2.65. Chrysolite has been quiet and irregular, but fairly strong; the sales amount to 4550 shares at $6@$6.75@$6.25. Climax, under a small business, has been steady, the sales aggregating 6950 shares at 71@75c. Consolidated Virginia has had a very liberal business at steady prices; the sales amount to 12,500 shares, at $2.35@$2.75@$2.45. Copper Knob has been quiet but steady, with sales of 2500 shares at 5c. Deadwood records sales of 400 shares, at $10.75@$10. Dunkin has ranged between $1.70@$1.55, with sales of 3900 shares. Eureka Consolidated, on the announcement of the suit against the Richmond Company going in its favor, developed considerable strength; the sales amount to 800 shares at $30@$34. Findley has been quiet and steady, with sales of 3000 shares at 28@27c. Glass-Pendery has been somewhat irregular, under a moderate business; the sales amount to 16,000 shares at $1.95@$2.15@$2. Gold Stripe has been quiet, with sales of 700 shares at $2.95. Grand Prize has been quiet but steady, the sales amounting to 800 shares at $1.10@$1. Great Eastern has had a moderate business at steady prices, the sales amounting to 17,050 shares at 24@22c. Green Mountain has been very much neglected, the sales amounting to but 500 shares at $6.25. Hibernia has been quite active but weak, the sales aggregating 150,500 shares at $1.50@$1.05. Homestake only records sales of 38 shares at $25¾. Horn-Silver has been dealt in to the extent of 35 shares at $10. Hukill has been quiet and a little weak, the sales amounting to 3600 shares at $1.15@$1.05. Independence has been quiet, but shows quite an advance; the sales amount to 1570 shares at 23@50@48c. Indian Queen has been quiet but steady, with sales of 300 shares at $2.60. Leadville has been fairly active, but exceedingly weak; the sales amount to 34,862 shares at $1.90@$1.20. Little Chief has been quite active and irregular, being for the most time quite strong; the sales aggregate 61,890 shares at $1.30@$1.90@$1.55. Little Pittsburg has been quiet and fairly steady, the sales amounting to 2060 shares at $3.65@$3.85@$3.50. Moose has had a very fair business at declining prices; the sales amount to 27,200 shares at $1.60@$1.20. Navajo has had a moderate business at declining prices, the sales aggregating 6400 shares at $1.05@85c. North Belle Isle only records sales of 200 shares at 30c. Ontario has been dealt in to the extent of 50 shares at $37@$39. Plumas records sales of 800 shares at $1.85@$1.70. Rising Sun has been somewhat neglected, but about steady; the sales aggregate 1500 shares at $2.85@$2.70. Robinson Consolidated, under a moderate business, has been somewhat irregular; the sales aggregate 2900 shares at $7.75@$7@$7.38. Sierra Nevada has been quiet and irregular, with sales of 775 shares at $10@$12.25@$11.63. Silver King records sales of 150 shares at $21@$22.75. Spring Valley has had a larger business than usual at about steady prices; the sales aggregate 1500 shares at $3@2.90. Standard has been quiet and steady, with sales of 1185 shares at $24.50@$24. Starr-Grove has been very much neglected, but strong; the sales amount to 700 shares at $8.25@$9. Stormont has had a moderate business at declining prices; the sales aggregate 5800 shares at $3.75@$3@$3.25. Yellow Jacket records sales of 20 shares at $5. Catalpa has been somewhat irregular, but inclined to strength, under a moderate business; the sales aggregate 7100 shares at $2.65@$2.95@$2.80. Julia records sales of 100 shares at 55c.

Alta-Montana has been quiet and about steady, the sales amounting to 625 shares at $2.25@$2.10. American Flag records sales of 2200 shares at 27@26c. Bald Mountain has had a moderate business at 7@6c., with sales of 15,600 shares. Barcelona shows quite an improvement under a moderate business; the sales aggregate 8950 shares at $1.40@$1.90. Bechtel Consolidated has been about steady, under a small business, the sales amounting to 1250 shares at 85@80c. Best & Belcher records sales of 200 shares at $12. Big Pittsburg has been liberally dealt in at irregular prices during the week, but which grew very weak to-day; the sales aggregate 19,782 shares at $4@$4.75@$3. Black Jack has been quiet and irregular, but strong; the sales amount to 3300 shares at $1.25@$1.50. Bonanza Chief has ranged between 28@24c., with sales of 600 shares. Boston Consolidated, under a moderate business, has been irregular; the sales aggregate 14,250 shares at 35@50@37c. Boulder Consolidated has been quite active and irregular; the sales aggregate 40,250 shares at 95c.@$1.25@98c. Buckeye has ranged between 19@17c., with sales of 5200 shares. Bull-Domingo has had a moderate business at somewhat irregular prices; the sales aggregate 5040 shares at $2.45@$2.90@$2.50. Bulwer has been quiet and strong, with sales of 820 shares at $2.75@$3.10. Bye and Bye has been dealt in to the extent of but 1300 shares at 25c. Calaveras, under a moderate business, has been strong, but grew weak at the close; the sales amount to 28,900 shares at 24@28@23c. Caledonia, B. H., has been quiet, but shows some improvement, the sales amounting to 460 shares at $1.80@$2@$1.85. Catskill has been steady, with sales of 800 shares at $7.25@$7.50. Central Arizona has been very much neglected, the ales

amounting to but 100 shares at $4.50. Cherokee has been quiet and weak, the sales aggregating 2100 shares at $1.95@$1.75. Cheyenne Consolidated has ranged between 74@82@79c., with sales of 7500 shares. Consolidated Imperial has had a moderate business, the sales amounting to 7925 shares at 10@23@18c. Consolidated Pacific has been active and strong, the sales aggregating 21,800 shares at 86c@$1.10@$1. Consolidated Pay Rock has been quiet and steady, with sales of 600 shares at $1.55. Dunderberg, on the anouncement that the company's property will be worked by tributers, made some improvement; the sales amount to 1600 shares at 75@90c. Durango has had a moderate business at 16@19c. with sales of 15,300 shares. Dahlonega records sales of 300 shares at 6c. Goodshaw, under a small business, has been weak; the sales aggregate 2200 shares at 72@55c. Granville has ranged between 5@4c., with sales of 10,000 shares. Head Center records sales 100 shares at $3.25. Hortense has been active a little weak, the sales amounting to 28,000 ares at 60@53c. Iron Silver, under a small business, has been weak, the sales amounting to 2300 shares at $4@$3.20@$3.50. Lacrosse has been quite active but irregular; the sales aggregate 40,150 shares at 34@42@35c. Legal Tender records sales of 100 shares at $12. Lucerne has been quiet and weak, the sales amounting to 8300 shares at 15@12c. The Mariposa stocks have had a moderate business at irregular but weak prices. The sales of Preferred amount to 1300 shares at $9.50@$8; and Common 10,400 shares at $9.13@$6@6.50. Mexican has been quiet but strong, with sales of 510 shares at $8.13@$10.50. Mineral Creek has had a moderate business at improving prices; the sales amount to 24,400 shares at $1.15@$1.60@$1.50. North Standard has been quiet but steady, with sales of 5300 shares at 15@13c. Oriental Miller has been very active, irregular, and about steady; the sales aggregate 18,000 shares at $3.60@$4.15@$3.85. Quicksilver Preferred has been quiet but strong, the sales aggregating 1400 shares at $64¼@$66¼@$65¼. Common records sales of 1400 shares at $16.88@$18.75@$18. Rappahannock has had a moderate business at about steady prices, the sales amounting to 10,200 shares at 14@12c. Red Elephant has had a liberal business at declining prices; the sales aggregate 22,500 shares at 36@25c. Silver Cliff has had a very fair business at declining prices; the sales aggregate 15,960 shares at $6.38@$5.38. Silver Nugget has been quiet but strong; the sales aggregate 9300 shares at 28@39c. The new stock has been very much more active, but weak; the sales aggregate 23,780 shares at 80@65@72c. South Bodie records sales of 1600 shares at 15@25c. South Bulwer has been dealt in to the extent of 1700 shares at 35@30c. South Hite has had a fair business at improving prices, the sales amounting to 8000 shares at $1@$1.40@$1.30. Sutro Tunnel has been fairly active, irregular, and decidedly weak; the sales aggregate 32,750 shares at $2.40@$1.88. Tioga has been quiet; the sales amount to 950 shares at 75c. Tuscarora has ranged between 30@27c., with sales of 700 shares. Unadilla records sales of 7100 shares at 12c. Union Consolidated has been quiet, the sales amounting to but 200 shares at $9@$10.50. Vandewater, under a liberal business, shows considerable improvement; the sales amount to 27,200 shares at 52@75c. Willshire has been quiet but steady, the sales aggregating 1500 shares at $1.55@$1.50. South Hite, new, has been irregular, but has developed considerable strength; the sales aggregate 25,355 shares at 75c.@$1.35@$1.05. The State Line stocks have been quite active, irregular, and weak. The sales of No. 1 amount to 350 shares at $2.80@$2.50; Nos. 1 and 4, 13,000 shares at $2.80@$2.40; Nos. 2 and 3, 2900 shares at $10@$7.88@$9.13; and No. 4, 500 shares at $2.10@$2.35@$2.25. Crowell records sales of 19,400 shares at 8@5c. Crescent, under a moderate business, has been strong, the sales amounting to 5750 shares at $1.60@$1.80. Original Keystone has been dealt in to the extent of 150 shares at $1.90@$1.50. Noonday records sales of 100 shares at $2.40. Alta has been dealt in to the extent of 100 shares at $3.15, and Malachite 200 shares at $1.

UNLISTED QUOTATIONS.

Mr. L. V. Deforeest, No. 70 Broadway, under date of April 29th, 3 P.M., reports the current quotations of unlisted stocks as follows:

	Bid.	Offer'd		Bid.	Offer'd
Barcelona	....	$1.85	O. K. & Winnebago	....	$1.00
Breece	$1.25	1.50	Patagonia	....	0.75
Bald Mountain	.05	.06	Plata Verde	....	2.50
Carbonate Hill	.15	.25	Rico	....	.50
Con. Arizona	.80	.90	Sacramento	....	.25
Empire of Cal.	....	1.75	Santa Cruz	....	.75
Empire, Utah	2.00	2.50	Sir Rodr'k Dhu.	....	.25
Freeland	2.00	....	Silver Nugget, old	$0.38	....
Grand View	....	.60	Silver Nugget, new	.70	.75
Glass-Pendery	2.00	2.05	State Line, Nos. 1 and 4	2.40	2.45
Highland Chief	6.00	8.00	State Line, Nos. 2 and 3	9	9¼
Hite	5.50	....	Starr-Grove	....	9¼
Julian	....	1.25	Trinity	....	.50
Lowland Chief	.25	.50	Vandewater G.	.69	.71
Mack Morris	....	4½			
May Flower	....	.40			
Native Silver	.10	.50			
North Hite	....	.75			
Oriental & M.	3.90	4.00			

Large "opposition" holders are said to be selling Hibernia.

Tombstone, Arizona, is to have a building to cost $10,000, for the Tombstone Mining Exchange and brokers' offices.

There were sold at public auction on Wednesday 9500 shares of the Caribou Consolidated Mining Company at prices ranging from $2¼@2¾.

The State Line and Oriental Miller mines are attracting considerable attention, and are bringing pretty high figures. Will the public stop to think on what knowledge or authority they are buying these stocks?

It is reported that upon making a survey, the Big Pittsburg Company found that the richest of its ore which has lately been mined came from an adjoining property. This is said to be the cause of the weakness in this stock.

The Silver Cliff Company is said to have an indebtedness of $150,000, including $60,000 if the mill proves a success; for nine days, the company produced $14,000, and that the new mill is now treating about 100 tons per day.

From $10,000 to $12,000 per month profit is prophesied by a local Black Hills expert from the Caledonia mine. It is about time some showing was made by this company, which has been a great disappointment to its stockholders.

Messrs. Clark and Bothwell report that the machinery for the new 40-stamp mill for the Starr-Grove Company is arriving at the mine. They expect to have 20 stamps running July 1st, and the remainder Aug. 1st. In September they prophesy a 25c. dividend. They say Stormont is at work again. The mines are being pumped out. They expect to start crushing in about two weeks. A contract has been let for sinking the Savage shaft. A dividend is expected in June. The Barbee & Walker, in the same district, is reported to have made a strike. The Hite, which President Clark has recently visited, is reported to be in shape to pay a dividend in June.

The stocks of the Catalpa and Crescent mining companies have been listed on the New York Mining Stock Exchange. The officers report that the properties of both companies are on Carbonate Hill, directly east of Leadville, between the Morning and Evening Star mines on the north, and the Carbonate, Etna, and Glass-Pendery mines on the south. Work actively began in the Catalpa mine in June last, and at the present time it is netting $30,000 per month. Two dividends of $60,000 each have been paid, and the company claims on hand sufficient funds to pay another dividend of like amount in June. The Crescent mine directly adjoins the Catalpa, and was purchased principally by Catalpa owners, who found that the Catalpa ore-bodies extended into the Crescent. Work was begun in the latter mine in March, and the production this month will, it is estimated by the superintendent, amount to about $10,000.

OFFICIAL LETTERS.

Big Pittsburg.—A dispatch from the superintendent, dated April 26th, says:

Shipments of yesterday and to-day, 34 tons of third-class ore. Drifts 1 C and 2 A have connected in ore. Drift 4 C looks well and shows two feet third-class and three feet fourth-class ore. Last shaft 80 feet deep, with the bottom in iron.

The Canada Consolidated Gold Mining Company.—The superintendent of this company, under date of April 23d says: The work in the mine is the same (as last week), timbering and laying track in the deep shaf The Rand compressors and machinery have arrived at Stirling. One of the compressors has been delivered at the mines; but owing to the bad roads, the wagon on which the other was hauled broke down and will cause a little delay. In another week, I hope to be able to notify you that most of the contracts for machinery and supplies have been made.

Chapparal.—A letter received on the 27th inst. says:

I am pleased to inform you that the vein in Champion Tunnel No. 1 is on the improve. We are now passing in to the vein, where it is making strong sulphurets of lead and iron; the sulphurets of lead is a new feature, and may be taken as a very favorable indication. The contractors have made, this week, 12 feet, making the tunnel 115 feet, with the ground more favorable for working. Every thing about the vein is looking very favorable.

Cherokee.—The new superintendent reports fast progress of the work in the mine. The Garfield shaft is down 130 feet. A station has been made and a drift run 70 feet. Ore of the most promising character is coming in face of the drift. A second station will be made at the 200-foot level. In the mean while, as soon as the ore in the 130 is opened sufficiently, the mill will commence steady work.

Dardanelles.—The superintendent writes under date of April 16th:

* * * * * * Every thing is going on nicely at the mine. We had a very good blast on the 12th and another on the 13th. We are drifting under the cement at the west end of the claim, and will take out considerable gold soon. The prospects are very good. We intend to begin at once on the extension of the Vigilance tunnel, and that will open up the ground which I prospected, and will surely pay largely.

A telegram, dated the 26th inst., says:

Cleaned $1200 out of one undercurrent, Thursday, 21st. There are fifty undercurrents in all.

Copper Queen.—The superintendent, under date of April 21st, writes:

During the four days ending April 20th, the furnace has smelted 245,100 lbs. of ore and produced 52,462 lbs. copper bullion. Our shipments have amounted to 44,270 lbs., leaving about 10,000 lbs. on hand this P.M. Furnace is to-day working as well as usual, and will produce the average quanity of bullion. The supply of water from well continues as on first day of starting pump. New well is down ten feet, but have not yet encountered any water. At the mine, the drift southeast from winze No. 1 has passed through the soft material, mentioned in my last letter, and is now in hard iron ore, carrying some carbonate of copper. We have commenced a cross-drift to connect with winze No. 2, having discontinued the working of the latter for the present. We are taking fine ore from face of large cut in larger quantities than we need at present, but will stack it up on the dump. The shipments on April 15th were 24,549 lbs.; April 16th, 11,124 lbs.; and April 17th, 20,494 lbs. of copper bullion.

Father de Smet.—The superintendent reports from 1st April to the 15th April, that the lower tunnel connecting Eureka with McGinty winze had advanced 17 feet. Cook's contract on sill-floor, McGinty chamber, advanced 3 sets. Lemon & Co.'s contract on sill-floor, McGinty chamber, advanced 5 sets. A set on the sill-floor is a space $6½ \times 6½ \times 11$ feet. Rise from middle chamber, first level, to surface, advanced 17 feet. The company is adding 20 stamps to its mill, and it is intimated will probably not declare any more dividends until the cost of same is paid for.

Old Dominion.—The superintendent, under date of April 15th, says:

Making good headway on Old Dominion; averaging two feet per day on each opening; there are small stringers coming into the main vein across the full face of both tunnels; general outlook is, that a short distance ahead it will strike a very large body of high-grade ore; here the New York and Chicago show the same immense body of ore; have but three men at work extracting ore; they take out and wheel to dump 10 tons per day. The question of the amount of ore we have and the possibility of getting sufficient ore out to run four 30-ton smelters, is now settled beyond a doubt.

Silver Cliff.—The superintendent telegraphs that the mill crushed 102 tons April 26th. The bullion shipments Monday were 277 pounds instead of ounces, as has been erroneously reported. The present indebtedness of the company, including $60,000 due on the mill as soon as it is fully demonstrated that it works perfectly, is about $150,000. During the last nine days, the bullion receipts have amounted to $14,000.

Standard.—The official report of April 18th shows that the east cross-cut, 1000 level, is in from the shaft 222 feet. The west cross-cut is in 166 feet. The total length of the east cross-cut, 700 level, is 603 feet, with face in very hard rock. The south drift, 500 level, is in 203 feet, the vein being about five feet wide. The north drift, No. 1, 385 level, is in 270 feet, showing the vein 25 feet wide. Excellent progress is made in timbering the south drift on the Cook vein. Uprise No. 6 is up 229 feet, showing the vein 15 feet wide. On the 385 level, the vein continues from 10 to 20 feet wide; and on the 550 level, the vein in the stopes is about 15 feet wide. The new hoisting-engines were to be started on April 19th.

Tombstone.—The superintendent telegraphs:

Gird mill running well. Shall make about $90,000 in April. Mines looking extremely well. New incline into

GENERAL MINING STOCKS.

Dividend-Paying Mines.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	SHARES. Par Val	ASSESSMENTS. Total levied to date.	ASSESSMENTS. Date and amount per share of last.	DIVIDENDS. Total paid to date.	DIVIDENDS. Last Dividend.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. April 23. H.	April 23. L.	April 25. H.	April 25. L.	April 26. H.	April 26. L.	April 27. H.	April 27. L.	April 28. H.	April 28. L.	April 29. H.	April 29. L.	SALES.
Alice	Mon	3,000	10,000,000	400,000	25	*		80,000	Apr. 1881 10	7.75	.....	.....	.....	.....	.....	.....	.....	7.25	.....	.....	.....	200
Amie Con. s. L.	Col	.....	5,000,000	500,000	10	*		305,000	May. 1884 10	.52	.....	.55	.51	.55	.53	.....	.....	.55	.52	.53	.49	45,300
Argenta, s.	Nev	1,500	10,000,000	100,000	100	130,000	Mar.. 1881 20	40,000	Feb . 1880 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barbee & Walker	Ut'h	.....	1,000,000	100,000	10	*		60,000	Nov. 1880 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, G. S.	Col.	.....	10,000,000	100,000	100	*		25,000	Feb.. 1880 25	.....	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	100
Belle Isle, s.	Nev.	1,500	10,000,000	100,000	100	30,000	Feb. 1880 30	300,000	Dec. 1879 25	.56	.52	.59	.55	.57	.....	.....	.....	.55	.....	.....	.....	1,775
Belcher, G. S.	Nev.	1,040	10,400,000	104,000	100	2,250,000	Feb.. 1881 50	15,397,200	Apr. 1876 75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., G	Cal.	.....	10,000,000	100,000	100	75,000	May. 1879 1 00	1,200,000	Mar. 1880 25	.....	.....	.....	6.13	6.00	6.00	.....	6.00	5.75	.....	.....	.....	735
Breece	Col.	.....	5,000,000	200,000	25	*		2,000	Feb.. 1880	.....	.....	.....	1.40	.....	.....	.....	.....	1.40	.....	.....	.....	600
California, G. S.	Nev.	600	54,000,000	540,000	100	.....	.....	31,320,000	Dec.. 1879 50	1.40	1.30	1.40	1.35	1.50	1.30	1.50	1.45	1.45	1.35	1.35	1.30	8,035
Calumet & Hecla, C.	Mch	.....	2,500,000	100,000	25	.....	.....	19,350,000	Apr.. 1881 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caribou Con., G	Col.	1,400	1,000,000	100,000	10	*		50,000	Mar 1880 10	3.00	2.50	.....	.....	2.50	.....	3.13	2.75	.....	.....	.....	.....	2,500
Catalpa, s. L.	Col.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cedar Tree		.....	.....	.....	.....	.....	.....	.....	.....	2.65	2.60	2.65	.....	2.65	.....	2.70	2.65	2.70	.....	2.65	2.60	7,100
Chrysolite, s. L.	Col.	.....	10,000,000	200,000	50	*		1,100,000	Apr.. 1880 50	.....	.....	.....	.....	6.25	6.00	6.63	6.13	6.75	6.25	6.38	6.13	3,400
Climax, s. L.	Col.	.....	2,000,000	200,000	10	*		180,000	Aug. 1880 30	.75	.71	.72	.71	.73	.....	.72	.....	.74	.72	.75	.73	4,550
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	411,200	June 1873 3 00	42,930,000	Aug. 1880 50	2.65	2.35	2.55	2.45	2.65	2.50	2.75	2.65	2.60	2.50	2.55	2.45	6,950
Copper Knob	N.C.	.....	1,000,000	1,000,000	1	*		15,000	Nov.. 1880 02	.....	.....	.05	.....	.....	.....	.05	.....	.....	.....	.....	.....	12,500
Crown Point, G. S.	Nev.	600	10,000,000	100,000	100	2,573,370	Mar. 1881 0 50	11,588 000	Jan.. 1875 2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,500
Deadwood Terra G.	Dak	.....	5,000,000	200,000	25	.....	.....	†250,000	Apr.. 1881 25	.....	.....	10.75	10.00	.....	.....	.....	.....	.....	.....	.....	.....	400
Dunkin	Col.	.....	5,000,000	200,000	25	.....	.....	145,212	Mar.. 1881 12½	1.70	.....	1.65	1.60	1 65	1.55	.....	.....	1.60	.....	1.60	.....	3,900
Eureka Cons., G. S. L.	Nev.	.....	5,000,000	50.000	100	100,000	May. 1876 1 00	4,605,000	Apr.. 1881 50	30.50	.....	32.00	30.00	32.00	30.25	34.00	32.50	34.00	.....	.....	.....	800
Excelsior W't'r & M. Co	Cal.	525 acres	10,000,000	100,000	100	.....	.....	850,000	Sept. 1880 25	.....	.....	.....	.....	5.00	.....	.....	.....	.....	.....	.....	.....	400
Father de Smet, G.	Dak	.....	10,000,000	100,000	100	.....	.....	315,000	Apr. 1881 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Findley, G.	Geo.	.....	200,000	200,000	1	*		6,000	May. 1879 1c	.....	.....	.27	.....	.....	.....	.28	.....	.....	.....	.27	.....	3,000
Freeland	Col.	.....	5,000,000	200,000	25	*		50,000	May 1880 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glass Pendery	Col.	.....	5,000,000	250,000	20	.....	.....	25,000	Apr.. 1881 10	2.05	1.95	2.10	1.95	2.15	2.05	2.10	2.05	2.15	2.05	2.05	2.00	16,000
Gold Stripe	Cal.	.....	1,500,000	150,000	10	.....	.....	67,500	Mar.. 1881 15	2.85	.....	.....	.....	2.95	.....	.....	.....	.....	.....	.....	.....	700
Gould & Curry, G. S.	Nev.	612	10,800,000	108,000	100	3,260,000	Feb . 1881 50	3,826,800	Oct. 1870 10 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Prize, s.	Nev.	1,500	10,000,000	100,000	100	265,000	Mar.. 1881 40	450,000	Sept. 1880 0 25	.....	.....	1.10	1.00	1.00	.....	1.00	.....	.....	.....	.....	.....	800
Great Eastern, G.	Dak	1,200	300,000	300,000	1	*		18,000	July. 1880 01	.24	.23	.24	.23	.24	.....	.24	.....	.24	.23	.23	.22	17,050
Green Mountain, G.	Cal.	4,350	1,250,000	125,000	10	*		146,875	Apr.. 1881 7½	6.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,500
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	3,586,000	Mar. 1881 50	1,598,000	Apr. 1871 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hibernia	Col.	.....	7.500,000	300,000	25	*		120,000	Feb . 1881 10	1.45	1.25	1.35	1.25	1.50	1.25	1.45	1.30	1 35	1.30	1.30	1.05	150,500
Homestake, G.	Dak	.....	10,000,000	100,000	100	200,000	Apr. 1878 1 00	960,000	Apr.. 1881 30	.....	.....	.....	.....	.....	.....	.....	.....	25.75	.....	.....	.....	38
Horn-Silver, s. L.	Uth.	.....	10,000,000	400,000	25	*		200,000	Jan.. 1880 25	.....	.....	.....	.....	.....	.....	10.00	.....	.....	.....	10.00	.....	35
Hukill, G. S.	Col.	3,288	1,000,000	200,000	5	*		210,000	Dec.. 1878 10	1.15	1.10	.....	.....	1.15	1.10	1.10	.....	1.10	1.05	1.10	1.05	3,600
Independence, s.	Nev.	1,500	10,000,000	100,000	100	155,000	Apr.. 1881 0 20	225,000	Sept. 1879 25	.25	.23	.26	.....	.50	.27	.....	.....	.48	.43	.48	.....	1,570
Iron Silver	Col.	.....	10,000,000	500,000	20	*		.....	.....	4.00	.....	4.00	.....	3.85	.....	3.85	.....	3 50	3.60	3.50	3.20	2,300
Indian Queen	Nev.	.....	250,000	125,000	2	.....	.....	226,250	Apr. 1881 05	2.60	.....	.....	.....	2 60	.....	.....	.....	.....	.....	.....	.....	300
La Plata, s.	Col.	.....	2,000,000	200,000	10	*		285,000	Mar.. 1881 7½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leadville Cons., s. L.	Col.	.....	4,000,000	400,000	10	*		150,000	Jan. 1880 15	1.90	1.75	1.90	1.75	1.85	1.40	1.60	1.45	1.55	1.40	1.40	1.20	34,862
Leeds, s.	Uth.	3,000	10,000,000	100,000	100	36,000	Feb . 1881 15	78,000	Oct.. 1878 15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, s. L.	Col.	.....	10,000,000	200,000	50	*		700,000	Aug. 1880 50	1.35	1.30	1.45	1.30	1.60	1.35	1.90	1.60	1.85	1.50	1.70	1.55	61,890
Little Pittsburg, s. L.	Col.	30 acres.	20,000,000	200,000	100	.....	.....	1,350,000	Mar.. 1880 50	.....	.....	3 85	3.70	3.75	3.65	3.75	3.65	3.85	3.63	3.55	3.50	2,060
Martin White, s.	Nev.	22,900	10,000,000	100,000	100	857,000	Mar . 1881 25	90,000	July. 1879 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose, s.	Col.	39,000	2,000,000	200,000	10	*		550,000	Mar. 1878 25	1.60	1.50	1.55	1.50	1.55	1.50	1.50	1.30	1.25	1.20	1.25	.....	27,200
Navajo	Nev.	500	10,000,000	100,000	100	175,000	Dec. 1880 0 20	25,000	Mar. 1881 25	1.05	.....	1.05	.....	.98	.86	.90	.85	.90	.85	.....	.....	6,400
N. Y. & Colorado, G.	Col.	.....	1,000,000	50,000	20	*		25,000	July. 1879 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Belle, s.	Nev.	1,600	5,000,000	50,000	100	.....	.....	1,775,000	Mar.. 1881 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17.50	.....	200
North Belle Isle	Nev.	1,500	10,000,000	100,000	100	25,000	Feb.. 1880 15	15,000	Sept. 1880 15	.....	.....	.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Ontario, s	Uth.	3,000	10,000,000	150,000	100	.....	.....	3,325,000	Apr. 1881 50	37.50	37.00	.....	.....	.....	.....	.....	.....	39.00	.....	.....	.....	50
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	3,092,600	Mar . 1881 1 00	1,603,200	Jan.. 1880 1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plumas, G.	Cal.	.....	1,000,000	100,000	10	715,000	.....	151,000	July 1879 8	.....	.....	1.85	1.70	.....	.....	.....	.....	.....	.....	.....	.....	800
Rising Sun	Cal.	.....	750,000	150,000	5	*		90,000	Feb.. 1881 15	2.80	2.75	2.85	.....	2.85	.....	.....	.....	.....	.....	2.75	2.70	1,500
Robinson Cons.	Col.	.....	10,000,000	200,000	50	*		175,000	Sept. 1880 50	.....	.....	.....	.....	.....	.....	7.75	7.00	7.50	.....	7.50	7.38	2,900
Sierra Nevada, G. S.	Nev.	.....	10,000,000	100,000	100	4,450,000	Jan . 1881 1 00	102,000	Jan. 1871 1 00	11.25	10.00	.....	.....	12.25	.....	11.63	.....	.....	.....	.....	.....	775
Silver King, s.	Ariz	.....	10,000,000	100,000	100	.....	.....	60,000	Apr. 1881 2	.....	.....	.....	.....	.....	.....	21.00	.....	.....	.....	22.75	.....	150
Spring Valley	Cal.,	3,650	200,000	200,000	1	*		50,000	Jan. 1881 5	2.90	.....	.....	.....	3.00	.....	3.00	2.90	3.00	2.90	.....	.....	1,500
Standard, s.	Cal.	1,500	10,000,000	100,000	100	50,000	July 1878 1 00	2,625,000	Apr. 1881 75	24.00	.....	24.25	24.00	24.13	24.00	24.25	24.00	24.50	24.25	24.00	.....	1,185
Starr Grove, s.	Nev.	.....	2,000,000	200,000	10	.....	.....	120,000	Apr. 1881 10	.....	.....	.....	.....	9.00	8.25	.....	.....	.....	.....	9.00	.....	200
Stormont, s.	Uth.	.....	200,000	200,000	1	*		135,000	Nov. 1880 30	3.75	3.60	3.75	3.63	3.55	3.50	3.55	3.40	3.38	3.00	3.50	3.25	5,800
Tombstone, s.	Ariz	.....	12,500,000	500,000	25	*		650,000	Apr. 1881 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket, G. s.	Nev.	1,200	12,000,000	120,000	100	3,978,000	Oct.. 1880 1 00	2,184,000	Aug. 1871 2 50	.....	.....	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	20

Non-Dividend-Paying Mines.

Alta-Montana	Mon	.....	5,000,000	500,000	10	*		.....	.....	.....	.....	2.20	.....	26c	.....	2.15	.....	2.25	2.10	.....	26c	625
Am. Flag, s.	Col	5,300	1,250,000	125,000	10	*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27c	26c	2,200
Bald Mountain	Colo	.....	10,000,000	1,000,000	10	*		.....	.....	7c	6c	7c	6c	7c	.....	7c	6c	7c	6c	.....	.....	15,800
Barcelona	Nev	.....	5,000,000	200,000	25	.....	.....	.....	.....	1.50	1.40	.....	.....	1.50	1.45	1.70	1.50	1.85	1.75	1.90	1.85	8,950
Bechtel Con., G.	Cal.	.....	10,000,000	100,000	100	162,750	Dec. 1880 0 15	.....	.....	83c	82c	85c	82c	80c	.....	80c	.....	.....	.....	.....	.....	1,250
Best & Belcher, G. S.	Nev.	545	10,080,000	100,800	100	992,900	Mar. 1881 50	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Big Pittsburg	Col.	.....	.....	.....	100	.....	.....	.....	.....	4.75	4.50	4.65	4.45	4.65	4.00	4.60	4.50	4.75	4.50	4.40	3.00	19,782
Black Jack	Cal.	.....	2,560,000	100,000	2½	*		.....	.....	1.40	1.25	1.45	1.35	1.40	.....	1.50	.....	.....	.....	.....	.....	3,300
Bonanza Chief	Mon	.....	1,000,000	1,000,000	1	.....	.....	.....	.....	26c	.....	28c	.....	.....	.....	.....	.....	24c	.....	25c	.....	600
Boston Con, G.	Cal.	.....	10,000,000	100,000	100	.....	.....	.....	.....	38c	35c	45c	40c	50c	42c	50c	42c	42c	37c	39c	37c	14,250
Boulder Con	Colo	.....	2,000,000	200,000	10	.....	.....	.....	.....	1.10	95c	1.25	1.05	1.20	1.10	1.20	1.10	1.20	1.05	1.15	98c	40,250
Buckeye	Col.	.....	2,000,000	400,000	5	*		.....	.....	19c	.....	18c	.....	17c	.....	.....	.....	17c	.....	.....	.....	5,200
Bull-Domingo	Colo	.....	10,000,000	200,000	50	*		.....	.....	2.70	2.65	2.75	2.50	2.60	2.45	2.90	2.40	2.85	2.75	2.85	2.50	5,040
Bullion, G. S.	Nev.	943½	10,000,000	100,000	100	425,000	Feb. 1881 1 00	.....	.....	.....	.....	.....	.....	25c	.....	.....	.....	.....	.....	.....	.....	820
Bulwer, G.	Cal.	.....	10,000,000	100,000	100	36,000	Dec.. 1877 50	.....	.....	3.90	2.75	.....	.....	3.00	2.95	3.10	.....	.....	.....	.....	.....	1,300
Bye and Bye	Ariz	.....	1,000,000	100,000	10	*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,900
Calaveras, G.	Cal.	2,000 acrs	500,000	500,000	1	*		.....	.....	25c	24c	25c	24c	28c	25c	28c	26c	28c	24c	24c	23c	400
Cal., B. H., G.	Dak.	.....	10,000,000	100,000	100	425,000	Mar . 1881 0 50	.....	.....	.....	.....	.....	.....	1.90	1.80	.....	.....	2.00	.....	1.85	.....	800
Carbonate Hill	Col.	.....	2,000,000	200,000	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catskill	Nev.	.....	1,500,000	30,000	1	.....	.....	.....	.....	.....	.....	7.38	.....	7.38	7.25	7.38	.....	7.50	.....	7.50	.....	800
Central Arizona, s.	Ariz	.....	10,000,000	100,000	100	.....	.....	.....	.....	.....	.....	.....	.....	4.50	.....	.....	.....	.....	.....	.....	.....	100
Cherokee, G.	Cal.	.....	1,500,000	150,000	10	.....	.....	.....	.....	1.95	.....	1.85	1.80	1.85	1.75	1.75	.....	1.75	.....	1.75	.....	2,100
Cheyenne Cons	Dak.	.....	300,000	300,000	5	.....	.....	.....	.....	76c	74c	76c	75c	81c	75c	82c	77c	79c	.....	.....	.....	7,500
Colorado Central	Col.	.....	3,000,000	300,000	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Columbia Con., G. S.	Nev	.....	5,000,000	100,000	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	1,325,009	Jan.. 1881 0 10	.....	.....	18c	.....	17c	16c	23c	20c	19c	.....	.....	.....	19c	18c	7,925
Con. Pacific, G.	Cal.	1,400	6,000,000	60,000	100	90,000	July. 1880 0 50	.....	.....	88c	86c	95c	87c	1.10	95c	1.10	1.05	1.10	1.05	1.05	1.00	21,800
Con. Pay Rock	Colo	.....	2,500,000	250,000	1	.....	.....	.....	.....	.....	.....	1.55	.....	.....	.....	1.55	.....	1.55	.....	.....	.....	6,300
Crowell		.....	.....	.....	.....	.....	.....	.....	.....	8c	5c	7c	.....	8c	6c	5c	.....	.....	.....	.....	.....	19,400
Dahlonega, G.	Ga.	.....	250,000	250,000	1	*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6c	.....	.....	.....	300
Dardanelles	Cal.	.....	1,000,000	100,000	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunderberg	Colo	.....	1,500,000	150,000	10	*		.....	.....	75c	.....	80c	75c	75c	.....	90c	.....	.....	.....	90c	.....	1,600
Durango	Dak.	.....	500,000	500,000	1	*		.....	.....	17c	16c	18c	17c	18c	.....	19c	18c	18c	17c	19c	18c	15,300
Empire	Ut'h	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Girard	Ariz	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glynn Dale Con. G	Cal.	.....	10,000,000	100,000	100	75,000	Jan.. 1881 0 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Placer, G.	Col.	.....	5,000,000	200,000	25	*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goodshaw, G.	Cal.	.....	10,000,000	100,000	100	145,000	Feb. 1881 15	.....	.....	72c	70c	87c	.....	67c	.....	60c	.....	60c	.....	55c	.....	2,200
Granville, G.	N. C	1,231 acs.	300,000	300,000	1	*		.....	.....	4c	.....	4c	.....	.....	.....	.....	.....	5c	4c	.....	.....	10,000
Harshaw	Ariz	.....	10,000,000	100,000	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Head Center	Ariz	.....	10,000,000	100,000	100	.....	.....	.....	.....	.....	.....	3.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Hortense	Col.	.....	2,000,000	200,000	10	.....	.....	.....	.....	60c	55c	58c	56c	58c	55c	58c	55c	56c	54c	53c	.....	28,000
Jacrosse	Col.	3,900	1,000,000	100,000	10	*		.....	.....	37c	34c	40c	37c	42c	40c	39c	38c	38c	36c	36c	35c	40,150
Legal Tender	Col.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00	.....	.....	.....	.....	.....	.....	.....	100
Leviathan	Nev	2,000	10,000,000	100,000	100	350,000	Mar. 1881 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lucerne	Col.	4,200	5,000,000	500,000	10	*		.....	.....	.....	.....	15c	14c	15c	14c	14c	13c	14c	12c	.....	.....	8,300
Mariposa preferred	Cal.	14,387	5,000,000	50,000	100	1,425,000	Dec. 1880	.....	.....	9.50	8.75	.....	.....	9.25	9.00	.....	.....	8.50	8.00	.....	.....	1,300
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	Dec.. 1880	.....	.....	9.13	7.50	8.50	8.00	7.75	7.25	7.00	6.00	7.63	6.13	7.00	6.50	10,400
May Belle, G.	Cal.	1,500	10,000,000	100,000	100	66,000	Mar . 1881 0 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mayflower	Colo	.....	1,000,000	100,000	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	1,488,200	Jan. 1881 0 50	.....	.....	8.75	8.13	10	.....	.....	.....	.....	.....	10.50	.....	.....	.....	510
Mineral Creek	Ariz	.....	2,000,000	200,000	10	*		.....	.....	1.25	1.15	1.45	1.25	1.50	1.40	1.60	1.45	1.60	1.50	1.50	.....	24,400
Miner Boy	Colo	.....	.....	.....	.....	*		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mono, G.	Cal.,	750	5,000,000	50,000	100	275,000	Dec.. 1880 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose Silver	Colo	.....	.....	3.000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Standard, G.	Cal.	.....	.....	.....	.....	.....	.....	.....	.....	15c	14c	.....	.....	15c	14c	14c	.....	14c	.....	13c	.....	5,300
Oriental Miller	Nev.	.....	.....	.....	.....	.....	.....	.....	.....	4.15	3.60	4.00	3.85	3.90	3 65	4 15	3.95	3.95	3.85	3.90	3.85	18,000
Quicksilver preferred	Cal.	8,500	4,291,300	42,915	100	*		.....	.....	.....	.....	65⅝	64¾	66	65¼	66½	66	66¾	.....	6½	.....	1,400
" common	Cal.	acres.	5,708,700	57,087	100	*		.....	.....	17	16¾	18	.....	18	.....	.....	.....	18.75	.....	18.00	.....	1,400
Rappahannock, G.	Va	345 acres	250,000	250,000	1	*		.....	.....	13c	12c	12c	.....	13c	.....	14c	13c	13c	12c	13c	.....	10,200
Red Elephant	Colo	.....	5,000,000	500,000	10	*		.....	.....	30c	30c	31c	30c	33c	29c	30c	29c	28c	28c	28c	25c	22,500
Silver Cliff, s	Col.	.....	10,000,000	200,000	50	*		.....	.....	6.13	6.00	6.38	5.38	6.00	.....	6.00	5.38	5.88	5.50	5.75	5.38	15,980
Silver Nugget	Ariz	.....	2,000,000	200,000	10	*		.....	.....	28c	.....	29c	.....	35c	33c	37c	32c	36c	33c	37c	.....	9,300
" new stock	Ariz	.....	2,500,000	250,000	10	.....	.....	.....	.....	72c	67c	74c	70c	78c	73c	76c	73c	80c	65c	73c	72c	23,780
South Bodie, G.	Cal.	1,500	10,000,000	100,000	100	85,000	Nov. 1880 0 25	.....	.....	.....	.....	15c	.....	.....	.....	.....	.....	.....	.....	25c	20c	1,600
South Bulwer, G.	Cal.	1,500	10,000,000	100,000	100	170,000	Dec.. 1880 0 25	.....	.....	30c	.....	33c	.....	35c	31c	.....	.....	30c	.....	.....	.....	1,700
South Hite	Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.10	1.00	1.40	1.20	1.35	1.30	1.35	1.30	.....	.....	8,000
Sutro Tunnel	Nev.	.....	20,000,000	2,000,000	10	.....	.....	.....	.....	2.40	2.30

Goodenough running, and fine show of ore. Ore averages higher grade than formerly.

A later dispatch from the treasurer, who arrived yesterday at the mine, says:

Visited mills to day. Both doing excellent work. Daily production over 4000 ounces. Will do better soon. The mines fully maintain expectations, and are responding freely at all points, while our reserves are increasing.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY	CLOSING QUOTATIONS. April 22.	April 23.	April 25.	April 26.	April 27.	April 28.	Opening. April 29.
Alpha	3¾	3¾	4⅛	4⅛	4	3¾	
Alta	3⅛	3	3¼	3⅜	3¼	3⅛	
Argenta							
Bechtel	29-32		11-16	11-16			
Belcher	2	2⅛	2⅜	2⅝	2⅝	2¼	
Belle Isle							
Best & Bel	11⅝	12	12⅞	12½	12⅝	12⅜	
Bodie	5	6	6	6	6	6	
Bullion	1¼	1⅜	1¼	1¼	1½		
Bulwer					3	3	
California	1⅜	1⅜	1⅜	1⅜	1⅜	1⅜	
Challar	2½	3	3⅜	3⅜	3½	3¼	
Con. Imp							
Con. Pacific							
Con. Va	2⅝	2½	2⅝	2⅝	2¾	2⅝	
Crown P'int	1¾	2½	2¾	2⅜	2⅜	2⅜	
Eureka Con	29½	29	29	33½	36	35	
Exchequer	1½	1¼	1¾	1¾	1½	1⅝	
Goodshaw	¾			19-32	19-32	½	
Gould & Cur	6⅛	6¾	7¾	7⅛	7¼	7⅛	
Grand Prize	½		15-16	15-16		1	
Hale & Nor	4¾	5⅜	6½	5½	5⅝	5⅜	
Mar. White	7-16			5-16	5-16		
Mexican	8⅜	9⅜	9¾	9¼	10⅜	9⅝	
Mono	1⅝	1¾	1⅞	2			
Navajo		1	15-16	27-32	13-32		
North. Belle	17⅛	17	17	16½	16⅞	17½	
Noonday	2	2	2½	2⅜	2¾		
Ophir	6¾	7	7¾	7⅜	7½	7	
Oro	27-32	1¼	1½	1⅜	1½		
Overman	1¾	2	2¼	2⅜	2	2	
Potosi	3½	4	4¼	4¼	4¼		
Savage	3½	3¾	4⅞	4¾	4½	4⅜	
Scorpion							
Sierra Nev.	10¼	10¾	11⅛	10¾	11⅛	10⅝	
Silver King	23¼	23¼	22	21¾	22	22¼	
So. Bulwer		5-16		11-32	11-32		
Tioga							
Tip Top	3¾	4	4⅛		4⅛		
Tuscarora							
Union Con	9⅛	9⅜	10	10	9⅞	9⅛	
Wales Con	1½	1⅝	1⅝	1⅝			
Yel. Jacket	4¾	4¾	5¼	5¼	5¼	5	

REVIEW OF THE SAN FRANCISCO MARKET.

The Comstocks are decidedly lower, Union Consolidated closing yesterday at $9⅛, Sierra Nevada $10⅝, Alpha $3¾, and the whole list at a corresponding decline. California is now extracting some 500 tons of ore per week, of an average value of about $25 per ton. From 30 to 40 tons of ore per day is being taken from the Sierra Nevada mine, which has an average value of $40 per ton. The result of the working of the hydraulic pump, which commenced operations on the 26th inst., will be looked forward to with considerable interest. This pump, it will be remembered, is for the purpose of draining the Hale & Norcross, Challar, Savage, and other mines. The pump is operated by water, and is calculated to save an immense outlay for fuel. It was built and erected by a San Francisco iron foundry on a new principle, at the risk of the inventors and makers, and thus far it is said to work well, and no doubt it will make it much easier to prospect a great deal of virgin ground that has never been touched, between the 2000 and 3000-foot levels, which may be thoroughly explored by means of crosscuts and drifts. A dispatch from Virginia City, Nev., April 28th, says:

The big hydraulic pump at the Combination shaft was started yesterday and is proving a splendid success. Yellow Jacket, Belcher, Imperial, and adjoining mines are being rapidly drained.

Senator Fair arrived here Wednesday. He is well pleased with the outlook in the lower levels. He will remain on the Pacific coast unless called to Washington.

A San Francisco dispatch says that it is reported there that Mr. Mackey has been buying Sutro Tunnel shares in London through a German banking-house, but that it is positively asserted that the Bonanza firm have not obtained control.

The completion of the Sutro Tunnel to the Yellow Jacket mine has aided the drainage of that section of the lode, and it is thought may eventually enable the managers to free the mines entirely from water.

Eureka Consolidated advanced to $36, at one time during the week, but reacted and closed yesterday at $35. This advance is owing to the recent decision of the Supreme Court of the United States, which has decided the controversy between the Eureka Consolidated and the Richmond Consolidated in favor of the Eureka Company, and under this decison the Richmond Company will be compelled to pay to the Eureka about half a million dollars damages, as there are 50,000 shares of this company's stock. This of itself would be equal to an additional value of $10 per share.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, April 28.

The market for copper stocks continues to rule dull, and without any special feature. Prices have not fallen off much, if any, and it looks as if the bottom had been reached, although we see no special indications of an advance at present, and so long as ingot copper rules at present figures, the market will not show any material advance. The silver stocks are more active, and at both Boards the transactions for the week have been quite large.

Calumet & Hecla declined from $240@$238½, on sales of less than 100 shares.

Central advanced from $30@$31, closing at $30½.

Copper Falls declined from $9¾ (April 9th) to $8½, and again advanced to $9.

Franklin has ruled very steady at $12@$12½; only about 500 shares sold.

Pewabic dull, with only 25 shares sold at $16.

Quincy steady at $33@$34.

Blue Hill declined from $4⅝ (April 6th) to $3½, on sales of about 1000 shares.

Huron sold at $37⅛@$33¾.

Phœnix sold at $1 15-16.

Allouez sold at $3.

In silver stocks Catalpa takes the lead at the regular Board, with sales of about 8000 shares at $2⅝@$2¾.

Crescent has also been quite active at $1 13-16@$1⅞.

Harshaw finds purchasers at $10, about 1000 shares having been sold at that figure.

Silver Islet had one of its periodical spurts, and advanced from $31@$37, which was a little too much for it to hold, and it declined to $34, closing, however, to-day at $36, with assessment paid, $1.

Sullivan & Waukeag declined from $4@$2, rallying, however, to-day to $3 bid, with sales at $3⅜.

Duncan Silver, small sales at $3.

Bonanza Development, sales at $3@$3¼.

3 P.M.—The market closes steady, with prices unchanged, with the exception of Silver Islet, which was strong at $38 bid, $39 asked.

At the Boston Mining and Stock Exchange, Empire continues to be the leading specialty, the sales reaching over 57,000 shares at prices ranging from 97c.@$1.10.

Simpson Gold Mining Company, of N. C., has also been largely dealt in, declining from 23@4c. per share, from which it advanced to 17@18c.; closing sales at 14@15c.

Milton Mining and Milling Company, one of the Maine mines, declined from $1.04@83c., closing to-day at 87c. bid.

Massachusetts & New Mexico, ranging from 55@62c.

Mendocino continues in good demand at $3.50.

Other specialties continue to be more or less dealt in, and the market closes to-day active and firm generally all round.

The following is a synopsis of the transactions in mining stocks at the Boston Stock Exchange, and at the Boston Mining Stock Exchange, for the week ending April 27th.

NAME OF COMPANY.	Opening.	Highest.	Lowest.	Closing.	Sales.
Arizona Queen	1.37	1.37	1.25	1.30	3,400
Blue Hill, c	4.00	4⅛	3⅜	3¾	550
B'n'nza D'v'l'mt	2 15-16	3.00	2 15-16	3.00	1,000
Boston & Eureka	1.52	1.55	1.51	1.51	900
Breece	1.40	1.45	1.40	1.45	300
Cal. & Hecla, c	239¾	240	238½	238½	74
Catalpa	2 11-16	2⅞	2 21-32	2 13-16	6,585
Central, c	30	31	30	31	40
Copper Falls, c	8¼	9.00	8¼	9.00	200
Crescent	1⅞	1¾	1 13-16	1⅞	4,275
Deer Isle	.65	.75	.65	.75	400
Dental Naboli	3.25	3.50	3.25	3.50	400
Douglass	3.75	3.75		3.75	100
Duncan, s	3.00	3.00		3.00	50
Dunkin	1.65	1.72	1.59	1.59	3,400
Empire	1.02	1.15	.95	1 02	61,980
Franklin, c	12	12⅜	12	12⅜	550
Harshaw	10	10.25	10	10.25	650
Huron	3⅝	3⅞	3¾	3¾	150
Indian Queen	2.60	2.60		2.60	100
Mass. & N. Mex	.60	.70	.56	.56	10,300
Mendocino	4.00	4.00	3.37½	3.50	2,150
Milton	1.00	1.15	.83	.83	9,100
N. E. W't'r M't'r	4.00	4.00		4.00	105
North Castine	3.75	4.25	3.75	4 25	3,000
Pewabic, c	16	16		16	75
Phœnix	1 15-16	1 15 16		1 15-16	500
Pine Tree	1.25	1.25		1.25	100
Promontory Con	9.00	9.50	9.00	9.50	400
Quincy, c	33¾	33¾	33	33	80
Ridge, c	3⅞	3⅞		3⅞	50
Salem-Sullivan	.25	.25		.25	100
Silver Islet, s	31	37	31	34	545
Simpson Gold	.23	.24	.04	.16	14,600
South Bulwer	.45	.45		.45	100
South Hite	1.40	1.40		1.40	100
Sul'v'n & Wa'k'g	3⅜	3⅜	2.00	2.00	1,055
Sycamore	1.52½	1.55	1.50	1.50	2,650
Town Site	1.28	1.31	1.26	1.30	3,150
Twin Lead	1.40	1.40		1.40	110
Tremont Silver	.82½	.88	.81	.88	1,800

c. Copper. s. Silver.

Philadelphia.

THE PHILADELPHIA MINING STOCK EXCHANGE.

The *North American* of the 25th inst. says:

The Philadelphia Mining Exchange met yesterday afternoon, and unanimously agreed to the plan of consolidation with the National, reported by the joint committee. Consequently the Philadelphia has dissolved as a separate organization, its room at 310 Chestnut street has been abandoned, and its members are received into the consolidated Exchange on the same footing as those of the National. As already stated, the new concern will occupy the fine hall in the Merchants' Exchange building, at Third and Dock streets, which the National has used since its start. This step is the natural result of the establishment of the National, which has gradually come to do a larger business than the Philadelphia, till it became evident that to keep both running would not pay. The new Exchange will certainly do a large business, and still have plenty over for the Board of Brokers' Mining Annex. The consolidated Exchange has one of the brightest and handsomest halls in the city.

The stockholders of the Dauntless Mining Company met yesterday, and authorized the directors to issue $10,000 of new bonds to raise money to employ labor at the mines. This will constitute a first lien, and the bonds are to be sold at not less than 75 per cent. The machinery is in good condition; the new eighty-five foot shaft has struck promising ore; and energetic labor is all that is wanted.

The Philadelphia *Times* of the 28th inst. says:

At the meeting of the Philadelphia Mining Stock Exchange yesterday, Mr. J. Whitaker Wright was elected president, and Mr. J. H. Strickler vice-president. Mr. Wright returned thanks to the members for the honor of being their choice, and in a short address said it would be to the interest of all for the Annex of the Philadelphia Stock Exchange to join hands and have but one Mining Exchange in this city, and predicted an increased business, with or without the Annex, in mining shares, as the result of the consolidation just made.

It is reported that negotiations are on foot with a view to the absorption of the Stock Board's Annex by the Philadelphia Mining Stock Exchange. The members of both organizations are reticent on the subject; but it is believed that the Philadelphia has appointed a committee with power to act, and that the Stock Board is seriously considering a proposition from them, through a committee composed of members of the Annex.

The *Times* says:

At the special meeting of the Argent stockholders on the 27th inst., it was resolved to increase the capital stock 200,000 shares, which was recently subscribed for at 25 cents per share. As this action will require a stock vote and a two thirds majority, it was resolved to keep the polls open at the office of the company for one week, to give all shareholders an opportunity to vote. This issue of stock will give the company $50,000, all of which is to be expended upon the development of their four mines, a resolution being adopted that the bonded indebtedness of the company was not to be paid until it became due.

The transactions in the following list comprise the dealings from the 22d to the 27th inclusive, with the exception of Tuesday, the 26th, which is omitted through the non-receipt of the quotations of that day. The total sales of mining stocks yesterday, the 28th inst., aggregated 117,075 shares, of which nearly 100,000 shares changed hands on the Philadelphia Board, and 17,000 shares on the Stock Exchange Mining Annex.

NAME OF COMPANY.	Opening April 22	Highest during the week.	Lowest during the week.	Closing April 27	Total shares sold.
Amie	.53	.54	.53	.53	3,300
Argent	.35	.36	.34	.36	3,300
Bechtel	.95	.95	.94	.94	500
Belle Isle	.56	.56	.55	.56	900
Boston Cons	.41	.42	.39	.40	2,900
Boulder Cons	.80	.95	.79	.95	1,600
Buena	.21	.22	.20	.22	17,800
California	1.55	1.55	1.50	1.50	900
Chrysolite	6.25	6.25	6.20	6.20	1,100
Cincinnati	.93	.93	.85	.85	2,500
Compromise	.50	.50	.43	.43	1,200
Con. Virginia	2.45	2.55	2.40	2.55	1,500
Copper Knob	.05	.05		.05	3,000
Crowell	.06	.07	.06	.06	5,400
Dahlonega	.07	.08	.06	.07	4,600
Dauntless	.06	.07	.05	.07	25,100
Denver City Con	1.25	1.25		1.25	4,200
Diam'nd Tunnel	3.35	3.50	3.35	3.50	1,400
Fairview Con	.06	.07	.06	.07	18,500
Findley	.28	.29	.28	.29	2,500
Fisk Con	5.25	5.30	5.25	5.30	2,800
Girard	2.50	2.50		2 50	200
Golconda	.26	.26	.24	.25	12,000
Governor Group	.30	.40	.30	.40	3,300
Grand Union	.08	.08		.08	300
Granville	.04	.04		.04	3,500
Great Eastern	.24	.24	.23	.23	2,300
Gunnison Imp't Co	3.35	3.35	2.85	2.85	2,200
Hibernia Con	1.45	1.50	1.35	1.40	7,700
Hukill	1.15	1.20	1.15	1.15	700
Iowa Gulch	.50	.54	.48	.49	96,650
Iron Silver	4.00	4.00		4.00	200
Leadville Con	2.00	2.10	1.85	1.85	2,200
Little Chief	1.35	1.90	1.35	1.90	3,000
Little Maud	.10	.10	.07	07	12,100
Lucerne	.14	.14	.13	.13	2,000
Moose	1.50	1.50		1.50	700
Mt. Lincoln	.08	.13	.08	.10	39,100
National	.45	.45	.36	.36	8,500
Orion	1.35	1.40	1.35	1.40	800
Pembina	1.15	1.25	1.05	1 05	3,000
Penn Breckenridge	.10	.11	.10	.11	6,034
Pizarro	.11	.11	.10	.10	5,000
Pizarro Extens	.06	.08	.06	.08	2,400
Red Elephant	.36	.36	.35	.35	600
South Mountain	2.50	2.50		2.50	500
Standard	.12	.12		.12	2,800
Sutro Tunnel	2.25	2.50	2.25	2.45	1,400
Tombstone	5.00	5.50	5.00	5.40	2,650
Victor	.05	.05		.05	2,500

COAL STOCKS.

NAME OF COMPANY.	Capital Stock.	SHARES. No.	SHARES. Par Val.	Last Dividend. Mo.	Y.	R't.	Rate per Ann.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share. April 23. H.	L.	April 25. H.	L.	April 26. H.	L.	April 27. H.	L.	April 28. H.	L.	April 29. H.	L.	SALES
	$		$				Per c'nt													
Am. Coal Co.	1,500,000	60,000	25	....	..	....	....													
Col. C. & I.	10,000,000	100,000	10	.....	..	....	....	55¼	51½	51¾	53⅛	.....	.....	54	.....	.....	.....	55⅛	....	1,617
Ches. & O. RR	15,000,000	150,000	100	.....	..	....	...	24½	24⅞	.....	....	25	...	25	.....	25¼	25	23½	25⅛	1,250
Consol. Coal	10,250,000	102,500	100	Jan.	77	2½	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumb. C. & I.	500,000	5,000	100	....	..	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. C.	20,000,000	200,000	100	Aug	76	4	9	+	108¼	109¼	108¾	108⅝	108	109⅛	108	109	....	108⅜	107⅞	9,715
D., L. & W. RR	26,000,000	524,000	50	Mar.	81	1½	6	‡	117⅜	118½	116⅞	118⅜	117¼	118¼	117⅛	118½	117¼	117⅜	116⅜	109,186
Elk Lick C Co	.....	.....	.....	.....	..	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lehigh C. & N	10,448,550	208,971	50	Sept	76	1½	5½	45⅜	45⅞	45⅛	45¼	45⅛	45⅜	45⅛	.....	45⅝	45⅛	.. ..	.....	8,109
Leh. V'y R. R.	27,042,900	540,858	50	.....	..	....	1	61½	.....	61⅛	.....	61¼	61	61⅜	.....	61⅝	61⅜	.....	.....	2,441
Mary'd Coal	4,400,000	44,000	100	Jan.	76	1½	1½	..	..	.....	.....	.....	.....	27	.....	.....	.....	.....	.....	300
Montauk C'l.	2,500 000	25,000	100	.....	..	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris & Es'x	15.000.000	300 000	50	.....	..	....	7	§	122⅜	.....	.....	.....	.....	124	122½	.....	.....	123¾	123	4,832
New Cen. C'l	5,000,000	50,000	100	Dec.	80	2	....	....	.....	27	.....	.....	.....	27	26	.....	.....	.....	.....	700
N. J. C. RR.	20,600,000	206,000	100	Apr	76	3½	2¾	99⅝	98⅞	99⅜	98⅜	98⅛	97½	98¾	97	98⅜	97⅛	97¾	95⅜	93,313
Penn. Coal..	5 000,000	100,000	50	Oct.	79	3	....	.....	.....	.....	.....	.....	.....	.....	.....	24"	.....	.. ..	....	50
Penn. R. R.	60,870,200	1,337,404	50					69¾	69⅜	69¾	69⅜	69⅜	69⅛	70	69¼	70⅛	69¾			58,154
Ph. & R. RR*	34,278,150	685,563	50	Jan	76	2½	10	56⅝	57¾	57½	56⅛	57	56⅜	67¼	56	56¾	52	5 ¼	50	60,637
Spring Mt. C'l	1,500,000	30,000	50	.....	..	....	6	....	.....	.....	.....	.....	.....	25	.....	.....	.....	.....	.....	200
Cameron C'l.	.. ..	...	...	....	..	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Of the sales of this stock, 28,062 shares were sold at the Philadelphia Stock Exchange, and 32,575 shares at the New York Stock Exchange.

†109⅝. ‡118¼. §122⅛. Total Sales..... 350,534.

Coal Stocks.

NEW YORK, Friday Evening, April 29.

Throughout the week just past, these stocks have been very dull, and the transactions have been lighter than for any previous week this year. Prices have, as during the preceding weeks, ruled a little lower. It is announced that the net earnings of the Delaware, Lackawanna & Western Railroad for March were but a little less than one per cent. on the capital stock.

The various decisions of late in favor of the McCalmont interest in Reading seem to have had a depressing influence on the price of the stock, as it has steadily declined, and sells to-day at $50 (seller 60 days), or lower than at any time this year. The sales in this market amount to 32,575 shares.

Delaware & Hudson Canal has recorded sales of but 9715 shares at $109⅝@$107⅞. Delaware, Lackawanna & Western has sold to the extent of 109,186 shares at prices fluctuating between $118½@$116⅝. New Jersey Central has been active and weak, the sales amounting to 93,343 shares at $99¼@$95⅝.

In the United States Circuit Court, on the 27th inst., Judges McKennan and Butler made the following decree restraining the issue of the "blanket" mortgage bonds by the Philadelphia & Reading Railroad Company:

And now, on this 27th day of April, 1881, it is ordered and decreed that, until the final hearing of this case, or until further order of this court, the defendant corporation and the other defendants, and each of them, are, and they hereby are, enjoined from executing this mortgage upon the property of the company for $150,000,000, as mentioned in the bill, and from executing any bonds or obligations secured by such mortgage upon the property of the company, and from doing any act toward the carrying out of the scheme of an issue of bonds or obligations as a part of an issue or issues, amounting in the aggregate to $150,000,000, to be secured as set forth in the bill and the exhibits thereto attached. Judge McKennan informed council for F. B. Gowen that the decree did not deprive him of the right to present any new plan to the court for the financial reorganization of the company.

On April 25th, the new board of directors of the Philadelphia & Reading Railroad held its first meeting in the office of the company, Major Bond presiding. A resolution was passed, formally revoking any power to act for the company conferred upon Mr. Gowen by any other board of managers. After the transaction of routine business, the board adjourned.

A meeting of the Executive Committee of the Central Railroad Company of New Jersey was held on the 25th inst., to consider further the proposed route to the West, and to a connection with the Wabash Railroad system. A member of the committee said afterward that there had been a long discussion of the subject, but nothing had been accomplished. He expressed the opinion, however, that the original plan would be carried out. This included the use especially of the low-grade road of the Pennsylvania Railroad Company. Terms have been agreed on by the two companies, but the contract has not yet been signed. The adoption of this route makes necessary also the building of two pieces of road, together about ninety miles long, which will extend the line to Youngstown, Ohio. At that point, connection can be made by existing lines with the Wabash system. A new road from Youngstown to Fort Wayne—a branch of the New York, Chicago & St. Louis Railroad Company—has been projected, which will give a more direct connection.

The receivers of the Reading Railroad and Coal and Iron companies report that during the month of March the total receipts were $2,525,107.90, which, with those previously earned, make the gross receipts from January 1st to April 1st $9,055,584.81. The corresponding earnings in 1880 were $2,417,059.79 for the month, and $8,322,184.20 for the first quarter.

The receivers of the Lehigh & Wilkes Barre Coal Company announce that 3½ per cent interest will be paid on the registered income bonds of that company on and after May 16th. Transfer books close May 4th and reopen May 18th.

The statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburg and Erie for March, 1881, as compared with the same month in 1880, shows an increase in gross earnings of $566,118, an increase in expenses of $278,140, an increase in net earnings of $287,978. The three months of 1881, as compared with the same period in 1880, show an increase in gross earnings of $822,820, an increase in expenses of $768,357, an increase of net earnings of $54,463. All lines west of Pittsburg and Erie for the three months of 1881 show a surplus over liabilities of $966,937, being a decrease, as compared with same period in 1880, of $82,192.

BULLION MARKET.

NEW YORK, Friday Evening, April 29.

The market in London is reported quiet and weak, at 52d., and is without any special feature here at the figures of annexed table.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents.
April 23	52⅛	112¾	April 27	52	112⅝
April 25	52⅛	112¾	April 28	52	112⅝
April 26	52⅛	112⅞	April 29	52	112⅝

ARIZONA.

It is stated that the bullion yield of the Tombstone and Harshaw districts for the first quarter of 1881 aggregated $932,537.16.

Copper Queen.—The Arizona *Journal* says: On the 15th of September, 1880, the company made its first bullion shipment, and during the month 160,629 pounds were turned out by the smelter. Since then, the shipments have been as follows:

1880.	Pounds.
October	335,408
November	316,000
December	353,340
1881.	
January	303,118
February	316,000
March	304,972

The gross average price received for the copper has been 18½ cents per pound.

CALIFORNIA.

Bodie.—During the week ending April 22d, this mine shipped to the mill 116 tons of ore; average pulp-assay, $51.81.

Dardanelles.—The superintendent, under date of April 26th reports that they have cleaned up $1200 out of one undercurrent.

Standard.—The superintendent reports for the past week that 1010 tons of ore were shipped to the mill; average pulp-assay, $44.10; crude bullion received, 4381 ounces. Shipments to the company amounted to about $45,316.

COLORADO.

The Leadville *Circular* of April 23d gives the following table of the approximate daily output of the leading mines of the camp before the roads became impassable:

Mines.	Tons.	Mines.	Tons.
Miner Boy	12	Carbonate Hill	3
Florence	2	Henriette	50
Little Silver	12	Evening Star	50
Colorado Prince	0	Dunkin	15
Little Pittsburg	0	Robert E. Lee	40
Chrysolite	0	Silver Wave	100
Little Chief	0	Little Giant	0
Iron Mine	200	Crescent	5
Silver Cord	10	Highland Chief	30
Catalpa	15	Comstock	5
Little Ella	20	Matchless	15
Amie	0	Hibernia	5
Oro La Plata	45	Climax	0
Glass-Pendery	0	Big Pittsburg	8
Morning Star	35	Dyer	6
Columbia	0	Others, say altogether	30
Argentine	15	Etna	20
Virginius	0	Agassiz	5
Half-Way House	20		
Robert Emmet	10	Total, tons	793

Big Pittsburg.—The superintendent reports shipments for past week 69 tons third class ore; no settlements on account of disagreements in assays.

Custer County.—From one of our exchanges we learn that the receipts from sales of ore by the producing mines of Rosita, Custer County, for the three months ending April 1st, 1881, were as follows: Bassick, $500,000; Humboldt, $300,000; Pocahontas, $310,000; Leavenworth, $120,000; Lucille, $11,000; Polonia, $36,000; Twenty-Six, $2000; Horton, $1000; First Chance, $3000; Silver King, $1000; Ben Franklin, $10,500; Silver Coin, $1000; total, 1,297,000. During the same period, the mines of Silver Cliff, Custer County, received for the sale of ore $700,956, as follows: Bull-Domingo, $290,000; Silver King, $1000; Zoo, $256; Del Monte, $2000; Silver Cliff Company, $375,000; Plata Verde, $2500; Buffalo Hurter, $2600; Hecla, $5000; Vanderbilt, $20,000; Julian, $2000; Song Bird, $6000; Kate, $1600; Lone Star, $2000.

Dunkin.—Recent reports state that this mine has large resources of low-grade ore, averaging $25 net per ton. It is expected that the shipments of ore for this month will amount to 1200 tons.

Farwell Con.—It is reported that the yield of this company's mill since February 1st has been about $35,000.

Robinson Con.—This company closed a contract on the 23d, with the Boston & Colorado Works, for 10,000 tons of ore.

MAINE.

Sullivan-Waukeag.—On April 23d, three bricks, averaging about 900 ounces, were shipped from this mine.

MONTANA.

Butte.—The shipments of silver bullion through the express office at Butte for the week ending Saturday, April 16th, aggregated 2888 pounds, valued at $47,300.

NEVADA.

Comstock Mines.—The Gold Hill *News* publishes the following for the week ending April 18th:

	Tons of ore raised.	Assay value per ton.
California	585	$27.80
Con. Virginia	508	26.70
Sierra Nevada	209	.....

Indian Queen.—The superintendent reports by letter dated the 10th: Shipped 3 bars bullion, aggregating 4128 ounces, 636 fine, valued at $4,302.05.

UTAH.

Park City Smelter.—Bullion shipments from the Park

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date, from the first of January, 1881.

The shipments of silver bullion are valued at $1.29·29 per ounce, Troy; gold at the standard $20.67 per ounce, Troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. The price of silver being now about $1.12 per ounce, the following figures, where they relate to silver bullion, should be diminished by about 13½ per cent to arrive at actual value:

MINES.	States.	For the week.	Month of April.	Year from Jan. 1st, 1881.
Alice, G. S.	Mont	.....	$54,268	$340,718
Barbee & Walker, S.	Utah	.....	.....	81,155
Belmont, G.	Mont	.....	.....	15,270
Bodie, G.	Cal	$7,100	26,270	122,609
Bos. & Colo. S. W'ks.	Colo	.....	.....	665,000
California, G. S.	Nev	.....	29,940	63,776
Caribou, S.	Colo	3,085	3,085	46,702
Christy, S.	Utah	5,000	35,230	151,586
Concordia, G.	Cal	.....	.....	2,234
Connor, S.	Utah	10,000	15,750	44,125
Contention, S.	Ariz	28,050	129,320	756,598
Con. Virginia, G. S.	Nev	.....	29,000	114,000
Crismon-Mammoth, G.	Utah	1,800	6,925	22,179
*Custer, G. S.	Idaho	.....	.....	123,669
*Deadwood-Terra, G.	Dak	.....	.....	197,218
Derbec, G.	Cal	3,700	3,700	43,357
Dexter Mill	Mont	3,500	3,500	14,500
Elkhorn Mill	Dak	.....	.....	5,000
Eureka Con., G. S. L.	Nev	36,240	139,000	516,323
Exchange Silver	"	.....	.....	44,400
Ferry Bullion	Utah	.....	.....	7,210
Fresno Enterprise, G.	Cal	.....	.....	9,600
Frisco M. and S. Co.	Utah	4,636	18,011	73,709
Germania	"	7,480	14,880	87,299
Grand Central Mill	Ariz	19,731	45,917	106,568
Grand Prize, S.	Nev	.....	6,960	73,339
Hale & Norcross, G. S.	"	.....	.....	33,090
Head Center	Ariz	.....	.....	9,825
Hermosa Mill, S.	"	.....	.....	237,000
*Homestake, G.	Dak	.....	.....	265,281
Horn-Silver, S. L.	Utah	5,000	49,000	282,572
Idaho, G.	Cal	.....	.....	51,000
Independence, S.	Nev	.....	.....	14,000
Indian Queen, S.	"	.....	4,302	61,986
Iron Silver	Colo	.....	.....	264,331
Jocuista, S.	Mex	.....	.....	82,000
Lexington	Mont	.....	.....	7,000
Little Chief, S. L.	Colo	.....	.....	63,314
Mack Morris	Ariz	5,294	10,549	68,271
Mingo	Utah	.....	.....	4,554
Morgan Smelt'g Wks.	"	.....	.....	24,179
Morning Star	Colo	.....	.....	15,200
Mount Potosi	Nev	.....	8,450	59,830
Navajo	"	6,000	21,500	74,481
Nevada Silver Ore	Utah	.....	.....	11,875
Noonday, G.	Cal	6,050	24,090	114,283
Northern Belle, S.	Nev	25,150	84,200	393,087
Oneida, G.	Cal	.....	.....	8,684
*Ontario, S.	Utah	31,678	86,757	713,187
Ophir, G. S.	Nev	.....	.....	5,170
Pascoe, S.	Utah	.....	.....	3,450
Rebellion	"	.....	.....	3,760
Richmond, S. L.	Nev	.....	58,903	456,594
Robinson Con., S.	Colo	.....	.....	107,000
Sierra Nevada, G. S.	Nev	.....	50,600	67,375
Silver Bow	Mont	.....	.....	51,342
Silver King, S.	Ariz	18,340	76,440	201,238
Sullivan, S. L.	Maine	.....	.....	5,000
Standard, G.	Cal	23,700	169,402	729,002
Star, S.	Nev	5,000	12,800	44,013
Stormont, S.	Utah	.....	.....	77,749
Syndicate, G.	Cal	.....	6,000	32,987
Tintic M. and M. Co.	Utah	.....	2,384	36,653
Tip Top	Ariz	.....	.....	147,900
*Tombst'e M. & M. Co., S	"	.....	20,199	385,127
Union Con., G. S.	Nev	.....	.....	43,100
Wood Fiver	Idaho	.....	.....	6,450

G. Gold. *S.* Silver. *L.* Lead. * Official.

City Smelter for the week ending April 15th : 439 bars, weighing 44,315 lbs.

MISCELLANEOUS.

Bullion Receipts from the Mines to New York.—The bullion received from the mines at the various offices in this city during the week ending with yesterday, as compiled from various sources, amounts to $236,686.08, as against $193,346.23, reported in our last.

The Gold Flood.—$1,926,000 in foreign bullion has arrived at this port, in addition to that announced in our issue of the 23d inst.

Exports of Gold and Silver from New York.

Week ending April 23d	$124,200.00
Corresponding week last year	47,280.00
Since Jan. 1st this year	3,864,769.00
Corresponding period last year	3,167,333.00

Gold Interest Paid Out by the Treasury.

Week ending April 23d	$232,014.08
Corresponding week last year	152,054.30
Since Jan. 1st this year	16,957,775.64
Corresponding period last year	18,702,852.25

WASHINGTON, April 28.—The Treasury Department to-day purchased 410,000 ounces of fine silver for delivery at the San Francisco, New Orleans, and Philadelphia mints.

The weekly statement of the Imperial Bank of Germany shows an increase in specie of 5,320,000 marks.

METALS.

NEW YORK, Friday Evening, April 29.

There is nothing of importance to note in the metal market since our last issue, excepting that tin has slightly improved in tone, and copper is rather weaker, in spite of continued shipments to Europe.

Copper continues flat, and without business in a large way, and the market is rather shaky. Lake for spot stuff is nominal at 18¾@18¾c. ; Baltimore, 18⅝@18¾c. Further shipments of Lake have been made to Europe, aggregating about 200 tons.

STATISTICS OF COPPER—JANUARY TO MARCH, AS PER CUSTOMS RETURNS.

		Jan. 1 to March 31.		
		1881. Tons.	1880. Tons.	1879. Tons.
Imports.	Pure in Pyrites	3,423	4,603	3,308
	" Precipitate	5,669	4,561	3,954
	" Ore	2,234	3,714	2,842
	" Regulus	674	1,093	1,893
	Bars, Cakes, etc	7,170	10,574	11,697
	Total	19,170	24,545	23,691
		March only.		
		1881. Tons.	1880. Tons.	1879. Tons.
	Pure in Pyrites	1,366	2,036	1,150
	" Precipitate	2,728	1,692	1,309
	" Ore	419	1,112	819
	" Regulus	76	437	1,095
	Bars, Cakes, etc	2,322	5,668	3,915
	Total	6,911	10,945	8,288
		Jan. 1 to March 31.		
		1881. Tons.	1880. Tons.	1879. Tons.
Exports.	Raw (English)	4,202	3,855	3,896
	Sheets	3,467	3,706	3,463
	Yellow Metal at 60 per cent.	2,293	2,201	2,324
	Brass " " 70 "	741	467	560
	Total	10,703	10,229	10,243
	Foreign	2,048	4,523	3,570
	Total	12,751	14,752	13,813
		March only.		
		1881. Tons.	1880. Tons.	1879. Tons.
	Raw (English)	1,685	1,503	1,507
	Sheets	1,053	1,376	1,447
	Yellow Metal at 60 per cent.	777	676	1,164
	Brass " " 70 "	310	199	192
	Total	3,825	3,754	4,310
	Foreign	646	1,701	1,495
	Total	4,471	5,455	5,805
		Jan. 1 to Dec. 31.		
		1880. Tons.	1879. Tons.	1878. Tons.
Imports (all descriptions)		92,734	97,071	87,572
Exports —	English	44,587	44,575	42,282
	Foreign	14,895	17,837	12,719
	Total	59,482	62,412	55,001

STOCKS.

1880.	England.	France.	Total, England and France.	Chili afloat.	Total, England, France, and Chili afloat.
January 31	35,222	2,483	37,705	16,712	54,417
February 28	34,732	3,164	37,896	19,666	57,562
March 31	37,831	4,187	42,018	16,479	58,497
April 30	38,978	3,937	42,915	14,225	57,140
May 31	37,172	4,756	41,928	16,430	58,358
June 30	39,618	5,174	44,792	12,925	57,717
July 31	38,437	5,239	43,676	15,302	58,978
August 31	38,657	4,660	43,317	14,353	57,670
September 30	39,953	5,631	45,584	10,424	56,008
October 31	38,859	6,518	45,377	12,472	57,849
November 30	40,012	6,295	46,307	11,014	57,321
December 31	40,056	6,462	46,518	9,278	55,796
1881.					
January 31	38,320	6,241	44,561	11,493	56,054
February 28	40,680	5,946	46,626	10,848	57,474
March 31	41,114	3,720	44,834	9,445	54,279

Our English advices by mail include April 19th :

April 11th. The Easter holidays have produced the usual quiet state in the metal market, and not much activity is looked for before the close of next week. Transactions chiefly for cash at £60¼@£60¾, with takers at the close for cash at £60½ full terms.

April 12th. Sales Chili Bars at £60⅛@£60⅝ cash. Three months' stuff is quoted £61¼@£61½.

April 13th. Values are now at same point at which they stood on April 14th, 1880, while statistics show an improvement of 5 per cent as compared with that date. G. o. bs. sold from £60½ usual terms down to £60 sharp cash, less discount only.

April 14th. Chili Charters not yet to hand. The tone seemed a trifle stronger, and £60 was freely bid for g. o. bs. cash, without sales.

Values of fine Australian are nominal, at £70 for Wallaroo, £67 for Burra Cake. English steady; Tough Cake, £64@£65; select Ingot £66½@£67½; India Sheets, £70@£71 ; Yellow Metal Sheets are now quoted 5⅞@6⅛d. ℔ lb. ; the leading makers having entered into a combination to fix prices and settled the present quotation at the highest figure.

April 19th. Telegrams are to hand announcing charters for the first half of April of 3500 tons, chiefly forward shipments and by sailing vessels, of which 200 tons bars, 1500 tons pure in Ores and Regulus for England, 1800 tons bars for orders here or the Continent.

	1881. Tons.	1880. Tons.	1879. Tons.	1878. Tons.
Charters Jan. 1st to March 31st	7,182	13,399	11,282	12,463
Charters April 1st to 15th	3,500	1,269	637	833
Shipments Jan 1st to March 31st	8,114	11,897	12,242	11,909
March only	3,700	3,032	4,340	4,153

The price of bars at Valparaiso on the 12th inst. was $21, exchange 28d., and taking steamer freight at 60s., would bring value to £60¼ laid down in Liverpool, but without commission to merchants on either side.

Values here are slightly easier than on Thursday last (when we closed at £60¼, rather buyers); £59½ cash, though without brokerage, having been accepted for 75 tons g. o. bs., at which there are still further sellers, with takers at £59 11/16 usual terms.

Tin.—This metal shows rather more tone. It has just transpired that the large holder here has sold some 300 tons during the past three months, being about one half the stock in the market, and it is presumed this has gone into consumption. Sales have been made to merchants of about 200 tons at 20@20¼c. spot stuff. We quote for jobbing lots : Straits, 20¼@20½c. ; Billiton, 20½c. ; L. & F., 20⅛@20¼c. ; Australian, 20⅜@20½c. Shipments from Singapore and Penang to United States during last 14 days of month amount to between 125 and 150 tons.

By cable to-day, London quotes £87 for spot stuff, with steady market ; Penang, $26.95 ; Singapore, $27¼ buyers, sellers holding for higher prices ; exchange, 2s. 10½d.

Our English advices by mail include April 19th.

April 11th. Rather quiet ; moderate trade done for cash at 87⅝@88s., remaining with sellers over at the top figure, usual 14 days prompt.

April 12th. Values somewhat easier ; transactions reported at 87½@87⅝s. ; early cash, 88½s. Closing prices were 87⅝@87¾s. cash ; 88¼@88¾s. three months.

April 13th. A fairly good market, Australian and Straits changing hands at 87⅝@87⅝s. sharp and ordinary cash terms ; forward prompts fetching 87¾@88⅛s., according to time of delivery. Closing cash values were 87¼@87¾s., and three months metal 88⅜@88¾s.

April 14th. The Billiton sale in Batavia of 840 tons, on 12th inst., went off at an average of 59·80fl. per picul, equal to about 88¾s. in Holland. To-day's market for Straits and Australian opened firm, with business at 87⅝s. cash, but afterward fell to 87½s. sellers, buyers offering only 87⅜s., and so closed. We note about 100 tons sold 87¼@87⅝s. cash, 88s. for delivery end May.

The metal market closed from Thursday evening, April 14th, until Tuesday morning, April 19th.

April 19th. Market a shade easier, Australian and Straits changing hands from 87⅝s., usual 14 days, down to 87⅛s. cash, in a week. Of Billiton, 1000 slabs found buyers at 89s. for delivery end of August next.

STATISTICS OF TIN, JANUARY TO MARCH, AS PER CUSTOMS RETURNS.

		Jan. 1 to Feb. 28.		
		1881. Tons.	1880. Tons.	1879. Tons.
Imports, foreign		6,492	6,393	4,413
Exports.	Foreign	2,696	2,540	1,565
	English	989	1,166	1,302
Tons		3,685	4,706	2,867
		March only.		
		1881. Tons.	1880. Tons.	1879. Tons.
Imports, foreign		2,192	2,181	1,656
Exports.	Foreign	722	737	402
	English	423	464	537
Total		1,145	1,201	939
		Jan. 1 to Dec. 31.		
		1880. Tons.	1879. Tons.	1878. Tons.
Exports.	English	4,395	6,218	6,210
	Foreign	8,785	8,844	6,620
Tons		13,180	15,062	12,830

Tin Plates.—We have no particular change to note since our last. The market is a shade easier at slight reduction in prices, and sellers have been more inclined to meet buyers' views. We quote per box as follows : Charcoal tins, Melyn grade, ⅛ cross, $6¼@$6⅝ ; Allaway grade, $5¾@$6. Charcoal Roofing, Dean grade, $5½ for 14 × 20, and $11⅛@$11¼ for 20 × 28; Allaway grade, $5⅝@$5½ for 14 × 20, and $10⅝@$10¾ for 20 × 28. Coke Roofing, B. V. grade, $5 for 14 × 20, and $10 for 20 × 28. Coke tins, A. B. grade, IC, $5⅜@$5½ ; B. V. grade, $5.05@$5.10 ; ICW, $4½ for 14 × 20.

Messrs. Robert Crooks & Co., of Liverpool, under date of April 14th, say that tin and terne plates, more especially during the past few weeks, have been in good demand, and the effect therefrom on stocks has been most marked. These are now getting quite into reasonable shape ; and if we can only keep production down, makers ought soon to be able to get cost at least. Buyers are following the advance most cautiously, and it is only in charcoal ternes that advanced prices have been any thing like freely paid.

Pig-Lead.—Yesterday, a sale of 200 tons was made at 4·45c., which is the lowest point reached for some time. The market closes in a hesitating state and quite nominal ; 4½c. is asked, but 4·45c. would be accepted if offered.

The *Age of Steel*, under date of St. Louis, April 23d, says :

The lead market is at stagnation point, no reportable transactions in that article having occurred during the week. The quotation of prices, which we make—4·375 cents—being merely nominal.

The shipments over the St. Louis and San Francisco Railroad, for the week ending April 21st, were 173 tons.

Spelter and Zinc.—Nothing doing. Market dull and inactive, with prices nominal. We quote the former at 4⅞@5c., and the latter 7c.

The *Age of Steel*, under date of St. Louis, April 23d, says :

The fact that spelter is quoted in New York at 5 cents, and the further fact that it costs about 40 cents per 100 pounds to lay Carondelet spelter down in the city, brings its market price down to such a figure that manufacturers can not afford to operate. There is only one of the Missouri Zinc Company's furnaces at Carondelet in operation, and the Glendale and Carondelet furnaces are out of blast entirely, the former for several months, and the latter since last week.

Antimony has shown a slight improvement since our last ; for Cookson's we quote 14½c. ; Hallett's and Johnson's, 14¼@14½c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 29.

The lack of business in some departments has had its weakening effect on prices. There is no great alarm shown, nor do we think there is particular cause for any. The outlook favors a very large business, while foreign products will act as a preventive against high prices.

American Pig.—There is but very little business doing in pig-iron, and prices are weak. A few thousand tons forced upon the market would not bring quoted prices by a dollar or two ; while a similar inquiry to purchase would probably stiffen prices a little, but would still meet with favorable offers. A large consumption and demands on old contracts prevent any serious disturbance. We quote No. 1 Foundry at $24@$25 ; No. 2 Foundry, $22; and Forge, $20.

Scotch Pig.—It is reported that English Bessemer

iron can be bought at $23¼. This is not encouraging for our makers. Scotch Pig is very quiet and without feature. We quote Eglinton at $21.50; Coltness, $23.50@$24; Glengarnock, $22.50; and Gartsherrie, $22.50@23.

Messrs. John E. Swan & Brothers, of Glasgow, under date of April 14th, report 121 furnaces in blast, as against 115 at the same time last year. The quantity of iron in Connal & Co.'s stores was 545,318 tons, an increase of 2966 tons for the week. The shipments show a decrease since Christmas of 92,320 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 12,803 tons. The following were the quotations of the leading brands of No. 1 pig iron: Gartsherrie, 57s. 9d.; Coltness, 57s. 9d.; Langloan, 58s.; Summerlee, 56s. 6d.; Carnbroe, 53s.; Glengarnock, 54s. 6d.; Eglinton, 48s. 6d. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 42s. 6d.; No. 2, 40s. 6d.; No. 3, 38s. 6d.; No. 4, 38s.; No. 4 Forge, 37s. 6d.

Messrs. J. Berger, Spence & Co., of Manchester, under date of April 16th, say:

The reaction from higher prices respecting pig-iron noticed in our last has continued during the week, though by no means with the same rapidity. Still there has been a weakness in respect to values which has in its turn deterred otherwise probable purchasers from operating, thus severely limiting business and leaving the markets in a very unsettled condition. The Easter holidays will, no doubt, interfere with and discount the possibilities of an immediate recovery. Glasgow Warrants have receded almost daily, and buying has been very limited indeed. Sellers have been quite unable to resist the downward course of values. As we write, Warrants are quoted at 47s. 8d., and buyers offer under. Middlesbrough numbers have followed the lead of Glasgow, though not to the full proportionate extent. On Tuesday, No. 3 was nominally 38s. 6d., but business was impossible over 38s.; No. 1 being 41s. and No. 4 Foundry 37s. 3d. To the end of June delivery, 3d. per ton extra was accepted, and to December 1s. per ton sought. These figures do not hold out a very bright prospect. Hematites are less active. Lancashire iron is without change.

Rails.—A large business has been done since our last. Sales of about 40,000 tons of steel rails for fall and winter delivery are reported on private terms. The American steel mills are so full of orders that it is almost if not quite impossible to make contracts for delivery earlier than the fall or winter. For such delivery we quote at $59 at mills. A sale of 1100 tons of German steel rails has been made on private terms. Foreign rails in store or for early arrival are quoted at $62½. A few thousand tons of English iron rails have sold in small lots at $46@$49, according to weight of rail. A small business is doing in American iron rails at $46½@$49 at the works for heavy rails. The Bessemer Association has purchased the Thomas & Gilchrist patents for dephosphorizing iron in this country. The payment, said to be $275,000, was made on Monday.

Old Rails.—The sales have been quite liberal at weak prices. We note the following: 2000 tons of Ts. at $26 here; 1500 tons of Ts. and D. Hs. at $26@$27 in Philadelphia; 2000 tons of D. Hs. for shipment at $27¼; and 4200 tons D. Hs. from store at $27.

Wrought Scrap.—A sale of 300 tons, ex store, at $28 is reported. We quote from yard at $20.

We publish the following letters from our regular correspondents:

Baltimore. April 25.

[Specially reported by R. C. HOFFMAN & Co.]

The iron market remains quiet and without change in prices. Demand moderate at about the following rates:

Balt. Char.	$38.00@$40.00	Mot. and Wh.	$18.00@$19.00
Va. "	38.00@ 40.00	Cl. C. B. Bl'om	60.00@ 65.00
Anth. No. 1	24.00@ 26.00	" " Billets	@
" " 2	22.00@ 24.00	Refined Bl'm.	50.00@ 55.00
" " 3	20.00@ 22.00		

Cincinnati. April 26.

[Specially reported by JACOB TRABER & Co.]

Our market for pig-iron is very quiet. H. R. C. C. irons are very scarce and firm at the quotations, which are as follows:

	Four mos.
No. 1 Hanging Rock Charcoal Pig-Iron	$27.00@$27.50
No. 2 " " " "	26.00@ 26.50
No. 1 Tennessee " "	26.00@ 26.50
No. 1 Hanging Rock Coke "	24.50@ 25.00
No. 2 " " " "	23.00@ 23.50
No. 1 Jackson Co. Stone Coal "	20.00@ 24.00
H. R. C. B. Car-Wheels, all Nos	40.00@ 41.00
Southern C. B. Car-Wheels, all Nos	37.00@ 38.00
Virginia " " "	39.00@ 40.00

Louisville. April 26.

[Specially reported by GEORGE H. HULL & Co.]

The market is very dull; consumers are buying only what they need for immediate consumption. Manufacturers are all busy, and the amount of iron melted is larger than ever before. The small sales are a legitimate consequence of the large contracts made a few months since for future delivery. The makers of favorite brands are having all they can do to keep up with their contracts. Prices are unchanged. We quote for cash, as below:

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal	$27.00@$28.00	$25.00@$27.00
Southern Charcoal	23.00@ 24.00	22.50@ 23.00
H'n g Rock, Stc'l & Coke	23.50@ 24.00	22.50@ 23.00
Southern Stonecoal & Coke	23.50@ 24.00	22.50@ 23.00
"Amer. Scotch"	$22½@$23½	Silver Gray. $20.50@$22.50
Scotch Iron	24.00@ 25	

MILL IRONS.

No. 1 Charcoal, cold-short and neutral	@
No. 1 Stc'l & Coke, cold-short and neutral	$21.50@$22.00
No. 2 Stc'l & Coke, cold-short and neutral	21.00@ 21.50
No. 1 Missouri and Indiana, red-short	26.00@ 27.00
White & Mottled, cold-short and neutral	17.00@ 19.00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, cold blast	$35.00@$41.00
Alabama and Georgia, cold blast	35.00@ 40.00
Kentucky, cold blast	35.00@ 40.00

Milwaukee. April 27.

[Specially reported by R. P. ELMORE & Co.]

The stock of Lake Superior iron, in this market, is very small, and not up to demand, consequently prices are firm at the following quotations, while the supply for other kinds and grades are in full supply. We quote as follows:

CHARCOAL IRONS.

No. 1 Lake Superior per gross ton	$31.00@
" 2 " " "	30.50@
" 3 " " "	33.00@
" 4, 5, and 6 " " "	35.00@
No. 1 Am. S., " " "(Foundry)	26.00@
" 2 " " "	25.00@
" " Silvery, " "	24.00@
Sum. Imp. Scotch, " "	29.00@

F. o. b. cars here; four months.

Pittsburg. April 26.

[Specially reported by A. H. CHILDS.]

Market remains depressed, and but few sales are being made, but prices are not quotably lower than at date of last report.

	4 mos.		4 mos.
No. 1 F'dry	$25.00@$26.00	M. & White	$19.00@$22.00
No. 2 "	23.50@ 25.00	Hot Blast Ch.	27.00@ 34.00
Gray Forge	21.00@ 26.00	Cold Blast W.	34.00@ 42.00

Richmond. April 26.

[Specially reported by ASA SNYDER.]

There is no lull in consumption, although it is evident that supply is increasing over the demand, and prices are weaker in consequence, although not quotably lower.

John H. Austin & Co.'s Special Market Report.

LONDON, E. C., April 14.

STEEL RAILS.—Since our last report, nothing has transpired to alter the tone of the market, which is very steady. We are buyers for May, June shipment to the extent of 2000 tons, 56 lbs., and can not fill the order in the time. July forward may be quoted £6 2s. 6d.@£6 10s. per ton, according to section and ports of shipment.

IRON RAILS.—Very quiet. Welsh makes are quoted £5 5s.@£5 7s. 6d. per ton net cash, f. o. b., May forward; and East Coast, £5 2s. 6d.@5 5s. per ton.

BAR IRON.—£5 2s. 6d.@£5 5s. per ton.

OLD RAILS.—Buyers of Flanges at 76s., c. i. f., Philadelphia, May and June shipments; market otherwise inanimate.

HEAVY WROUGHT SCRAP-IRON.—Nominally 65s. per ton, f. o. b., but nothing doing.

OLD RAILWAY LEAF SPRING STEEL.—£6@£6 5s. per ton asked, May shipment.

OLD CAST-IRON RAILWAY CHAIRS.—40@43s. per ton.

STEEL RAIL CROPS.—72s. 6d.@75s. per ton, f. o. b.

STEEL BLOOMS, 7" × 7" AND UPWARD.—£5 15s.@£6 ter ton.

BESSEMER PIG-IRON, Nos. 1, 2, AND 3.—57s. 6d.@65s. per ton; flat.

SCOTCH PIG-IRON.—47s. 6d.@48s. cash.

MIDDLESBROUGH PIG-IRON, No. 3.—38s.@38s. 3d. cash.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 29.

Anthracite.

There is a very fair business doing in this class of coal, but full-time work, which is being conducted this week, is having a slightly weakening effect on prices. The Reading Company claims to have orders sufficient to keep it fully employed at steady work during the month of May; but the other companies are not so well situated, and there is a movement to bring about a curtailment next week. It is too early to state just what will be done, but it is probable that curtailment will be enforced.

The companies have not yet succeeded in gaining the public confidence in their plans for regulating the trade. There is, however, marked harmony among the companies, and the public has much greater confidence than it had a month or six weeks ago.

It is but natural to look for a comparatively small business between now and August 1st; but the indications point to a fair increase on the business for the the same period of last year. A few weeks ago, there was some talk of an advance of prices on May 1st. There is nothing said about it now, and it is generally conceded that it could not be maintained if it were.

Among the immigrants arriving there are a great many miners and other classes of laborers. The supply at the mines will probably be so great as to prevent any disturbance this year.

The production of anthracite coal last week was 415,746 tons, as compared with 408,448 tons for the preceding week, and 394,774 tons the corresponding week of 1880. The total production from January 1st to April 23d was 7,138,010 tons, as against 6,337,473 tons for the like period of last year, showing an increase this year of 800,537 tons.

Bituminous.

The Clearfield District is reported to have secured the New York & New Haven Railroad contract at a low figure. This business was held for years by the Cumberland producers. The Consolidation Coal Company is reported to have made a contract with the North German Lloyd line of steamships. To an inquiry, a representative of large Cumberland interests replied: "Yes, there is some improvement in the demand for bituminous coal, owing to its cheapness, but we can't get the business, the Clearfield producers being able to undersell us, and take all the desirable business. Their ability to take orders seems to be without limit."

The Board of Public Works appears to be standing in the way of the interests of the State of Maryland, by its neglect to take prompt action in the matter of the George's Creek & Cumberland Railroad connection. With this made, large shipments would be conducted by the canal, employment be given to boatmen, and a degree of activity would be witnessed greater than for years.

Messrs. Berwind, White & Co. will remove to No. 55 Broadway on May 1st.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ending April 23d, and years from January 1st:

TONS OF 2240 LBS.	1881. Week.	1881. Year.	1880. Week.	1880. Year.
Wyoming Region.				
D. & H. Canal Co.	45,670	1,006,195	52,737	968,150
D. L. & W. RR. Co.	59,839	1,164,648	45,014	1,018,332
Penn. Coal Co.	21,929	315,546	19,757	265,480
L. V. RR. Co.	22,935	329,007	9,712	298,834
P. & N. Y. RR. Co.	1,831	18,868	450	6,088
C. RR. of N. J.	22,812	654,701	31,674	461,457
Penna. Coal Co.	12,819	23,223	13,824	30,679
	187,835	3,512,188	172,628	3,049,020
Lehigh Region.				
L. V. RR. Co.	68,364	1,165,527	56,813	873,461
C. RR. of N. J.	31,510	526,402	46,222	580,757
S. H. & W. B. RR.		1,166		4,831
	99,874	1,693,605	103,035	1,459,049
Schuylkill Region.				
P. & R. RR. Co.	105,230	1,626,762	100,581	1,607,327
Shamokin & Lykens Val.	21,702	287,042	46,222	207,953
	126,932	1,913,804	118,173	1,815,280
Sullivan Region.				
St Line&Sul.RR.Co.	1,105	18,413	938	14,124
Total	415,746	7,138,010	394,774	6,337,473
Increase	20,972	800,537		
Decrease				

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1876	3,910,210 tons.
" " " " 1877	5,289,448 "
" " " " 1878	3,782,816 "
" " " " 1879	6,569,180 "

Belvidere-Delaware Railroad Report for the week ending April 23d:

	Week.	Year. 1881.	Year. 1880.
Coal for shipment at Coal Port (Trenton)	1,927	4,894	5,162
Coal for shipment at South Amboy	11,534	186,203	126,281
Coal for distribution	10,479	230,049	152,925
Coal for company's use	2,133	34,023	32,900

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania Railroad amounts to 42,773 tons, as compared with the corresponding period in 1880.

The Production of Coke for the week ending March 26th, and year from Jan. 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region)	1,943	28,046
West Penn. RR.	3,225	28,612
Southwest Penn. RR.	25,755	416,057
Penn. & Westmoreland Region, Pa. RR.	5,151	59,686
Pittsburg, Penn. RR.	13,039	140,279
Snow Shoe (Clearfield Region)	120	2,326
Total	51,233	675,006

The Production of Bituminous Coal for the week ending April 16th was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
*Tons of 2240 lbs	42,576	516,991
Barclay Region, Pa.		
*Barclay RR., tons of 2240 lbs	5,167	144,204
Broad Top Region, Pa.		
*Huntingdon & Broad Top RR.	4,149	76,459
East Broad Top	1,407	18,946
Clearfield Region, Pa.		
Snow Shoe	2,436	21,703
Tyrone and Clearfield	58,611	580,804
Alleghany Region, Pa.		
Pennsylvania RR.	6,395	78,343
Pittsburg Region Pa		
West Penn RR	5,185	94,444
Southwest Penn. RR.	376	10,053
Penn & Westmoreland gas-coal, Pa. RR.	14 029	241,610
Pennsylvania RR.	10,932	171,178

*For the week ending April 23d.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to April 29th, 1881.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken.
Alexandria			
Annapolis			
Augusta			
Baltimore			
Bangor			
Bath, Me			1.15
Beverly			
Boston, Mass			1.00@1.10
Bristol			
Bridgeport, Conn.			
Brooklyn			
Cambridge, Mass.			
Cambridgeport			
Charleston			
Charlestown			1.00@1.10
Chelsea			
City Point			
Com. Pt., Mass.			
E. Boston			
East Cambridge			
E. Greenwich, R. I.			
Fall River			.75
Fredericksb'g, Va			
Galveston			
Georgetown, D.C.			
Gloucester			
Hartford			.90
Hackensack			
Hudson			
Lynn			
Marblehead			
Medford			
Millville			
Milton			
Newark, N. J.			
New Bedford			.85
Newburyport			1.25
New Haven			.55
New London			
Newbern			
Newport			.75
New York			
Norfolk, Va			
Norwich			.75
Norwalk, Conn			
Pawtucket			
Philadelphia			
Portland			
Portsmouth, Va.			
Portsmouth, N.H.			1.20
Providence			.75
Quincy Point			
Richmond, Va			
Rockland			
Rockport			
Roxbury			
Saco			
Sag Harbor			
Salem, Mass.			1.10
Saugus			
Savannah			
Somerset			
Staten Island			
Trenton			
Troy			
Wareham			
Washington			
Weymouth			
Williamsbg, N.Y.			
Wilmington, Del.			
Wilmington, N.C.			

*And discharging. †And discharging and towing. ‡3c. per bridge extra. §Alongside. ‖And towing up and down. ¶And towing. **Below bridge.

The Production and Consumption of Coal in the World.

The statistics concerning the world's production and consumption of coal, iron, and the textile fabrics are briefly reviewed, and in an attractive manner, in a work by Professor von Neumann, of Vienna. It is entitled, *Review of the Production, Traffic, and Commerce of the World's Economy (Uebersichten über Production, Verkehr und Handel in der Welt-wirthschaft)*. The author concludes that, by the rapid increase in the production and consumption of these commodities during the period from 1865 to 1873, the economical condition of all countries was then in its best state. The crisis of 1873, however, produced a reaction, which spread over the whole globe, and only since the last months of 1879 signs became apparent which seem to point to the end of that particularly severe crisis.

The production of coal shows an enormous increase within a comparatively brief space of time. Great Britain, which, at the commencement of the eighteenth century, produced about 2,500,000 tons, and in 1860 already more than 83,500,000, had increased its production of coal in 1878 to more than 137,000,000. France, which in 1787 raised no more than 211,000 tons, and in 1860 8,000,000, had in 1878 reached the figure of 17,000,000; while the United States, which in 1830 produced 1,333,333, in 1840 a little above 3,000,000, in 1860 15,200,000, in 1877 had come up to the considerable amount of 54,300,000 tons.

The production of coal in those countries which raise about 97 per cent of the total output of the world, was since 1860 as in the following table, where the figures mean millions of tons:

	1860.	1866.	1872.	1873.	1874.	1875.	1876.	1877.
Great Britain	83,4	103,1	125,5	129,0	127,1	133,9	135,4	136,1
United States	15,2	22,1	45,7	51,3	48,6	48,3	49,8	55,2
Germany	12,3	28,2	42,3	46,1	46,6	47,8	49,5	48,2
France	8,3	12,3	15,9	17,5	17,0	16,9	17,0	16,8
Belgium	9,6	12,8	15,6	15,8	14,7	15,0	14,3	13,9
Austria Hungary	3,5	4,9	7,4	11,9	12,3	12,8	13,4	13,6
	131,3	183,4	255,4	271,6	266,3	274,7	279,4	284,5

The total output of coal in the whole world is computed as follows:

1860.	1866.	1872.	1873.	1874.	1875.	1876.	1877.
136	185,1	260	276,8	274,3	281,6	287,4	294

With regard to this enormous increase in the production of coal, the question seems to be of importance whether and when the resources of coal which are secluded in the earth may become exhausted. The more recent geological researches of distant countries show that there is no reason to fear soon for a total exhaustion; and if even old Europe were one day exhausted, coal could be brought here from North America, Asia, and Australia for many centuries to come, as the area of known coal-fields is estimated, in English square miles, in:

China	200,000	Germany	3,600
North America	193,870	France	1,800
East India	35,000	Belgium	900
Great Britain	9,000		

The great agricultural countries of the East contain still enormous treasures of mineral fuel, which have hardly been touched yet. Thus, in Russia, the coal basin of the Donetz alone covers an area of about 13,600 square miles, only second to the great North American coal basin, and it is estimated to contain 8,271,000,000 of cubic meters, or about 10,000,000,000 tons of coal and anthracite. China owns enormous masses of coal and anthracite, and Japan has coal-fields in fifteen of its thirty-eight provinces, or "ken." In East India, the coal measures cover 35,000 square miles in Bengal and Central India, while the United States are computed to possess 193,870 square miles of coal-fields, not to speak of Australia, which begins to supply all the Pacific with its excellent coal.

The consumption of coal is estimated to have been, in millions of tons:

	1865.	1874.	1877.
Great Britain	90.4	112,9	121,3
United States	18,8	45,2	49,7
Germany	26,6	46,3	47,6
France	17,7	23,0	23,8
Belgium	7,6	10,3	10,5
Austria-Hungary	5,0	11,7	12,3

Which figures, divided by the number of inhabitants, gives for every one, in tons:

	1865.	1874.	1877.
Great Britain	3·092	3·558	3·626
United States	0·598	1·162	1·064
Germany	0·730	1·129	1·114
France	0·470	0·638	0·646
Belgium	1·577	2·040	1·963
Austria-Hungary	0·139	0·327	0·330

In England, about one third was consumed by the manufacture of iron and steel, more than one fifth by the rest of the large industries, more than one sixth for domestic purposes, and all the rest by gas-works, water-works, mines, railroads, and steamers. In France, the metallurgical, industrial and gas-works consume 72 per cent; the household, 13 per cent; the transporting industries, 10 per cent, and the mines 4 per cent of the total amount.

It is interesting to compare the average prices for one ton of coal in England (best Wallsend-Newcastle in London), in the United States, and in Germany, during the following years:

	1869.	1870.	1871.	1872.	1873.	1874.
England...s. d.	17 8	19 7	25 5	46 7	31 2	
U. States do's. gold	3.85	3.82	4.00	7.32	3.75	4.00
Germany marks	5.92	7.04	8.64	10.94	10.56	
	1875.	1876.	1877.	1878.	1879.	
England...s. d.	25 11	20 1	19 11	19 0	17 0	
U. States, dols. gold	3.81	3.47	2.37	3.12	.....	
Germany...marks.	7.62	6.58	5.70	5.26	.....	

The coal mines of the world employ about 1,100,000 men, and procure them their daily bread. In 1876, in England, 514,500; Germany, 210,000; France, 97,000; Belgium, 101,000; United States, over 100,000; and in Austria-Hungary, 63,000 men were occupied in raising coal from the bowels of the earth.

Census Report of the Iron Industries.

J. M. Swank, Special Census Agent, makes the following report showing the number and capacity of the blast-furnaces, rolling-mills, steel-works, forges, and bloomaries in the United States at the close of the census year, May 31st, 1880:

Blast-furnace establishments	490
Completed blast furnaces	681
Rolling mill establishments	324
Single puddling-furnaces, each double furnace counting as two single furnaces	4,319
Rotary puddling-furnace (Sellers)	1
Danks puddling-furnaces	19
Hammers in iron rolling-mills	239
Heating-furnaces	2,105
Trains of rolls in iron rolling-mills	1,206
Nail machines	3,775
Steel-works	73
Bessemer steel-converters	24
Open-hearth steel-furnaces	37
Pot-holes for crucible steel	2,691
Trains of rolls in steel-works	136
Hammers in steel-works	219
Forges and bloomaries	118
Forge and bloomary fires	495
Siemen's rotator	1
Hammers in forges and bloomaries	141
Daily capacity of blast-furnaces in net tons	19,248
Daily capacity of rolling-mills in net tons	16,430
Daily capacity of Bessemer steel-converters in net tons	4,467
Daily capacity of open-hearth steel-furnaces in net tons	827
Daily capacity of crucible steel-works in net tons	445
Daily capacity of forges and bloomaries in net tons	720

In 1870, there were 25 States engaged in the manufacture of iron and steel; 30 States, the District of Columbia, and Wyoming Territory actually made iron in 1880.

The whole number of establishments in 1880 was 1005; in 1870, it was 808. The percentage of increase in the 10 years was 24·38. The size and capacity of the establishments were, however, much greater in 1880 than in 1870. As the capacity of blast-furnaces only was given in 1870, no complete data are available for a comparison of the capacity of all the works in the two periods. The daily capacity of the blast-furnaces in 1870 was 8357 tons, and in 1880 it was 19,248 tons—an increase of 130·32 per cent.

The whole amount of capital invested in the iron and steel industries of the United States in 1880 was $230,971,884; in 1870, it was $121,772,074; increase, $109,199,810, or 89·68 per cent. In 1870, there were 25 States engaged in the manufacture of iron and steel. Of these, South Carolina does not appear in the statistics of 1880. Its total production in 1879 did not aggregate 500 tons. The iron industry in this State has been practically abandoned. Since 1870, three States have for the first time engaged in the manufacture of iron, namely, Colorado, Kansas and Nebraska; also the territories of Utah and Wyoming. Utah did not, however, make any iron in 1880. It made a small quantity in each of the years 1874, 1875, and 1876, and it will make a larger quantity in the near future. California and Washington territory have made arrangements since the close of the census year to manufacture iron. New Hampshire made iron many years ago, but it does not appear in the statistics for 1870; it reappears in the tables for 1880. Oregon and Texas each built a blast-furnace in the decade preceding the census year 1870, but they did not make any iron in that year; they appear, however, in the statistics of production for 1880. The District of Columbia once had a blast-furnace in operation, but in 1870 it had no iron industry whatever; in 1840, the United States government owned and operated a small rolling-mill at the Washington Navy-Yard. Minnesota appears in 1880 for the first time among iron-manufacturing States, but its statistics relate only to the preparations that have been made to embark in the business. Thirty States, the District of Columbia, and Wyoming territory actually made iron in 1880. Twelve States made over 100,000 tons each in 1880.

Pennsylvania, which for more than 100 years has been the leading iron-producing State in the Union, made in 1870 a fraction over 50 per cent of the total product, and in 1880 it made a fraction over 49 per cent. At both periods, its prominence in the production of iron and steel was virtually the same. From 1870 to 1880, it increased its production 97 per cent, or from 1,836,808 tons to 3,616,668 tons, while the whole country increased its production 99 per cent, or from 3,655,215 tons to 7,265,140 tons.* Ohio was the next State in prominence in 1870, and it held the same rank in 1880. In the former year, it produced 449,768 tons, and in 1880 it produced 910,141 tons, an increase of 107 per cent. The third State in prominence in 1870 was New York, and it maintained this rank in 1880, but its growth fell far below that of its two sister States above mentioned. In 1870, it produced 448,257 tons; and in 1880, it produced 590,300 tons, an increase of 33 per cent. New Jersey was fourth in rank in 1870, producing 115,262 tons; but it was fifth in 1880, although in that year it produced 243,860 tons, an increase of 112 per cent. The fourth place in 1880 was taken by Illinois, which produced in 1870 only 25,761 tons, while in 1880 it produced 417,967 tons, an increase of 1522 per cent. Maryland ranked fifth in 1870, producing 95,424 tons in that year, while in 1880 it produced only 110,934 tons, an increase of 16 per cent, causing it to drop to the twelfth place. The sixth State in rank in 1870 was Missouri, with a production of 94,890 tons, which was increased to 125,758 tons in 1880, or 33 per cent, giving it the tenth place in that year. Michigan increased its production in the 10 years from 86,679 tons to 142,716 tons, or 65 per cent, taking the eighth place in rank in 1880. Wisconsin increased its production from 42,234 tons to 178,935 tons, or 324 per cent, giving it the sixth place in 1880. Indiana produced 64,148 tons in 1870 and 96,117 tons in 1880, an increase of 50 per cent. Of the New-England States, Massachusetts shows the greatest growth in the 10 years, increasing from 86,146 tons in 1870 to 141,321 tons in 1880, or 64 per cent, placing it ninth in rank.

Astonishing progress was made in the 10 years in several Southern States. West Virginia increased its production from 72,337 tons to 147,487 tons, or 104 per cent, giving it the seventh place in 1880. Alabama increased from 7060 tons to 62,988 tons, or 792 per cent. Georgia increased from 9634 tons to 35,152 tons, or 265 per cent. Tennessee increased from 34,705 tons to 77,100 tons, or 125 per cent. Kentucky increased from 86,732 tons to 123,751 tons, or 43 per cent, placing it eleventh in rank in 1880. Delaware increased from 8307 tons to 33,918 tons, or 308 per cent. Virginia increased from 37,836 tons to 55,722 tons or 47 per cent. All the States which made iron or steel in 1870 increased their production in 1880 except Maine, North Carolina, and South Carolina.

*It should be borne in mind that these figures do not indicate the actual production, but the total production by all the processes to which the iron is subjected; for instance, iron first contributes to the total as pig-iron, then as rails, etc., etc. The actual production, therefore, is much less than that given in the text.

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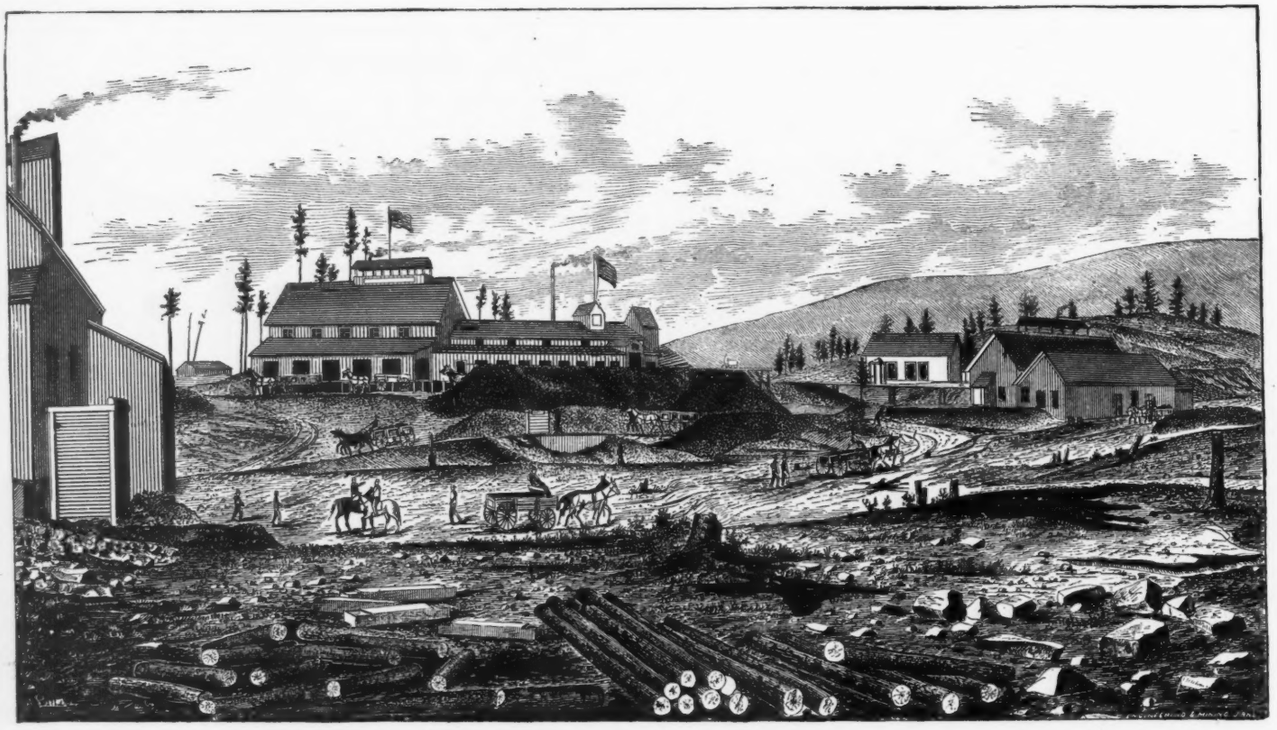

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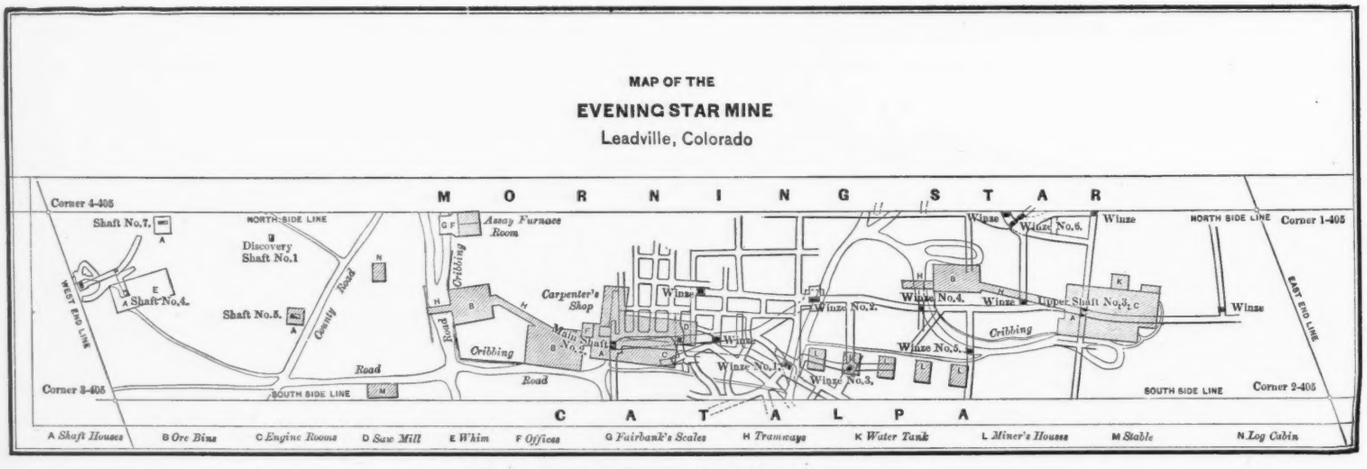

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